GLIMPSES
of
HEALTH AND MEDICINE IN MAURYAN EMPIRE

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PREFACE

For the first time, in recorded history, a vast centralised state had risen in India—The in fluence and many-sided activities of the Central Government were all pervasive and in some respects, the Mauryan state reminds one of modern dictatorships. An effort was made to control and regulate life.

Jawaharlal Nehru
in " THE DISCOVERY OF INDIA ".

The Protective and Healing powers of *Siva*, " the Lord of Medicines " or the Art of *Aswins*, the celestial Physicians of the Vedic Aryans, as well as the scattered references to Army surgeons in the Mahabharata and Ramayana, are shrouded in the mists of hoary antiquity. The historicity and the date of *Dhanvantari*, the God of Healing , mentioned in later Indian literature, as an *Avatar* of *Vishnu*, and as the teacher of *Sushruta*, have been the subject of frequent controversy or doubt. *Dhanvantari* will remain a myth (or mystery) till new archaeological or literary evidences come to light. The fame of the University of Taxila, as a centre of Medical teaching in the 6th century B.C., and the skill and the achievements of *Jivaka*, the personal Physician of *Buddha* are like remnants of *Stupa*. The traditionalstory ofIndian Medicine, depicting Professor *Atreya* lecturing at *Takshasila* to six students, who later composed the six different treatises on medicine, is gradually getting support from historic facts and recent finds.

It is only in the Mauryan Era that there is a definite change from the darkness of the night into the clear dawn of history. The Kings as well as the people of this period are neither supernatural nor mythical. At present, India lacks historical records in stone or in clay tablets, like those unearthed in the Assyrian excavations, or old medical papyri, like those discovered in Egypt, giving glimpses into the Practices and Principles of Medicine, in the second millennium or the first half of the firs millennium before Christ. From the time of Alexander't

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invasion of India, in 326 B.C., there were many ambassadors and visitors to India from Greece and other parts of the Middle East. Though the original voluminous treatises are no more in existence, fragments or summaries, have been preserved by later Greek and Roman writers. When one remembers that, even today, it is the custom and temptation of the literary hack and compendium writer to piece together only the most thrilling stories, traveller's tales, and the curious customs or descriptions of unheard of types of creatures (human or animal), leaving out the major part, dealing with the common people, their humdrum life and work, their thoughts and beliefs, and their practices, it is easy to understand how fragmentary and incomplete will be the story or picture of Indian Medicine, that one gets from the extracts, and summaries, now trumped up. There is another aspect of the Greek records. Most of the Greeks in India were sojourners or visitors and could not have had either wide knowledge or thorough acquaintance with the indigenous Arts and Sciences which were kept as closely guarded secrets by the intellectual groups of certain sects and families. Even after the Greeks had acquired some knowledge of the country and people, they must have continued to live in cities or in the royal courts or in isolated groups. The real India, the rural India, and the ordinary masses, might not have come into their field of vision. If Magasthanes wrote that Indians were ignorant of writing and trusted to memory, is there no other indisputable evidence now, to prove the contrary ? The grammar of Panini or the Vedic Hymns might have been committed to memory but was not the *Artha Sastra* of Kautilya or the *Kama Sutras* of Vatsyayana available as a written text ? Was it a miracle that produced the Asokan Edicts a few years after Magasthanes ? It seems obvious that Indians kept their sacred lore of books shielded from the curious eyes of the foreigners.

The extracts and summaries of the Greek observations on some aspects of Public Health and Medicine during the Mauryan Era are brought together and printed for the convenience of the reader. who would do well to bear in mind the limitations and handicaps and the fragmentary nature of the available writings.

The loss of the Greek treatises is unfortunate, irrepairable and irreplaceable. Fortunately for posterity,

in addition to the well-known rock edicts of Asoka, mentioning Hospitals for men and animals and Herbariums, there is still extant, a contemporary Indian Treatise, the *Artha Sastra* of Kautilya—a treatise on the " Science of Polity "—based probably on earlier texts and current practices and composed as a Manual of administration for the instruction and guidance of the Princes and people of the Mauryan Empire by no less a personage than Chanakya, the architect of the Empire, the Preceptor and Prime Minister of Chandragupta Maurya.

Any person familiar with the physical and intellectual life of the Mauryan Empire and its advanced state of civilization, may naturally expect a certain degree of attention paid to Hygiene, Public Health, and Medical Aid. One is also tempted to institute a comparison between the state of Hygiene and Public Health and practice of Medicine during 4th and 3rd century B.C., in Greece and the much advertised achievements in Public Health and Medicine, in the heyday of Roman civilisation. The pages of Kautilya surprise and thrill the reader and reveal the keen interest and knowledge in almost every one of the many aspects of Medicine, preventive and curative ; which are usually and falsely regarded as the conceptions, discoveries and achievements of the 19th century. The reader may judge for himself how astoundingly modern are some of the rules and regulations and practices of this pre-Christian civilisation.

It has been stressed that the preservation of Indian culture is due to her self-governing villages or rural republics, in which the seeds of our culture were sown and nursed—But, there there was also a deeper political philosophy which moulded Indian polity to this form. "Hindu thought counts *Dharma* as the true sovereign of the state, as the rule of law. The King is the executive called the *Danda* to uphold and enforce the decree of Dharma as the spiritual sovereign. Thus the king or temporal sovereign, is not the source of law in the Hindu State. The sources of Law are above and beyond him. They are not his creation. He has only to see to their observance." (R. K. Mookerji).

It is to be specially borne in mind that no references have been made in this monograph to any medical treatises. There has been no unanimity of opinion on the exact

dates or century in which these authors lived or compiled books. Many recent publications have dealt with some of these well known classics, their authorship, the date of composition, their contents, the theory and practice, etc. What is presented in this monograph is only a series of glimpses of medicine, of the life and work of the people and the changing picture of society, urban or rural, as reflected in non-medical literature.

In accordance with the modern concept of history of medicine, as adumbrated by Professor Sigerist, that it is only one aspect of civilization and culture, I have not hesitated to include anything or everything which may be directly or indirectly related to life, health, welfare, or suffering, dangers and diseases, physical or mental, in the individual, in the household, or in society, in peace or war, and in the background of religious, political, social, economic and cultural factors and environment.

D. V. SUBBA REDDY.

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POSTSCRIPT

It was in the late 30's that I started exploring the ancient Indian literature, religious, secular and medical, with a view to collect sources of information for the reconstruction of the History of Medicine in India. The fourth and third century B.C. is an eventful and glorious period of Indian History, not completely devoid of source materials, archaeological, epigraphical and literary, for the History of India, though some of the existing books, are much later productions, based on the earlier traditions or literature, contemporary with the foundation, rise and fall of the Mauryan Empire.

I began with the study and collections of extracts from the early Greek writers, who visited India or who described India, on the basis of what they heard or read from Greeks, that visited India before and after Alexander's invasion. The first two articles by me on the subject, were entitled "*Ancient Indian Medicine as described by early greek writers*" and published in the Medical Bulletin, Bombay, 1939-40. They were followed by an intensive study of health and medicine in Mauryan times, as reflected in Kautilya's

Arthasastra, and resulted in the publication of the following :

1. *Hygiene, Public Health and Social Welfare in The Mauryan Era*, '*Health*', 1943.
2. *The Physician in the Mauryan Empire*, '*Indian Physician*', 1943.
3. *Sidelights on Medico-Legal Problems of the Mauryan Era*, '*Indian Medical Record*', 1944.
4. *Food and Diet in the Mauryan Empire*, '*Health*', 1945.
5. *Veterinary Medicine in Mauryan Times*, '*Indian Veterinary Journal*', 1945.

Subsequently, about 1949-50, when I was Professor of Physiology in Madras Medical College, Madras, an attempt was made to bring all these articles together in the form of a book. An application was made to the Government of Madras, for permission to print and publish the book and the desired permission was also granted, after some correspondence. Estimates for printing were obtained. But, due to my sudden transfer from Madras to Visakhapatnam and later to Guntur and again to Madras, within 18 months, the programme of publication was dislocated and postponed from year to year. Even after the formation of the Andhra State and the creation of the Department of History of Medicine, the proposal to publish monographs on History of Medicine has taken more than three years, for obtaining necessary sanctions and facilities and for implementing the programme of publication of monographs. A few alterations and additions have been effected in the old draft of the monograph of 1949-50 and the arrangement of monograph into two parts, with different chapter-headings is intended to present the material in a more acceptable form to the general reader.

30-3-66 D. V. S. R.
Hyderabad.

PART I

GLIMPSES FROM ARTHA SASTRA OF KAUTILYA

INTRODUCTION

Artha Sastra of Kautilya

After the recent and learned discussion by Kangle on the subjects like 'Arthasastra, scope and origin', 'Kautilya's Arthasastra, content and form', 'Sources', etc., it may appear unnecessary and superfluous to deal with these topics in detail. It is, however, incumbent on me to review very briefly recent views and discussions on some questions.

Aim and Scope of Arthasastra.

Arthasastra is the science which shows how the activity of the acquisition and protection of the earth, should be carried out. It is the science of state craft, *i.e.*, politics and the administration. It is a very old branch of knowledge, which is said to have originated about 600 B.C. among the regional kingdoms mentioned as Mahajanapadas in Buddhistic literature. The Sastra is pre-eminently practical in aim, incorporating the duties and practices sanctified by custom.

The inclusion of 'Aupanisadika' section (BK XIV) brings it into close association with the magical rites of Atharvaveda and makes it the Sastra of the Purohits. It has to be clearly differentiated from Dharmasastra which is addressed to individual and lays down moral precepts and deals with ideal requirements, while Arthasastra is primarily concerned with the administration of a state by a ruler. The teaching of Arthasastra is mainly based on enlightened self-interest. The happiness of the King lies in the happiness of the subjects ; his own good, in their good. The Sastra insists on the ruler following a policy of benevolent paternalism towards the subjects.

Author and Date.

External Evidence :

The traditional view about the author, is the one put forward by Shama Sastry and accepted by Fleet, etc., that Kautilya, who placed Chandra Gupta Maurya, on the throne, is the author of the work. This view has been generally accepted in India from ancient times at least from 5th or 6th century A.D.

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The text is said to be remarkably free from Greek influence in Astronomy, a sphere in which the Greek influence is undeniable. It is also pointed out that there is no evidence of any influence of Greek political thought of the age of Plato and Aristotle, even after the close contacts during and subsequent to Alexander's invasion and the foundation of Greek colonies adjoining Indian kingdoms. Winternitz, who admits the possibility of Manu's indebtedness to Kautilya, suggested the possibility of Manu being indebted to an earlier work on the same Science

The similarity between Arthasastra and Silpasastra, in the rules relating to building of forts and palaces, has led some scholars to argue that the tradition of Arthasastra is much earlier than that of Silpasastra. Finally, the deities mentioned in Arthasastra, belong to an earlier period and are not known to Silpasastra. The Aswins are well known Vedic deities whose worship was abandoned in later times. The mention of 'Sakyas', 'Buddhists, and 'Sanghas', 'Ajivakas', is also taken as an indication of the society of the Mauryan age.

Kamasastra of Vatsayana also shows a close acquaintance with Arthasastra of Kautilya. Jolly, who made a detailed comparison between the two works, concludes that no long interval of time, can have passed between the composition of two such cognate productions but ascribes the work to third century A.D.

I feel inclined to adopt the attitude of Kangle, who rightly concludes the review of arguments against the traditional view with the words of H. Jacobi, "without weighty grounds, one must not push aside the unanimous Indian tradition; else one practices scepticism, not criticism" and that there is no convincing reason why this work should not be recognised as the work of Kautilya, who helped Chandra Gupta to the throne of Magadha.

But, in the light of history of Indian literature I am not unwilling to accept the suggestion of Hillebrandt and Keith that there was an old text by Kautilya and that the present text is a product of redaction of the old text, by his juniors or is a product of his school.

CHAPTER I

(*i*) Physicians, their Responsibilities and Privileges

Physicians and their wages.—The question of remuneration to physicians is considered in the section dealing with rules regarding slaves and labourers. The clubbing together of "artisans, musicians, physicians, buffoons, cooks and other workmen" serving of their own accord, indicates that the medical men were treated as workers. They were to get wages and the scale and penalty for non-payment are stated in the following words :—"As much wages as similar persons employed elsewhere usually get or as much as experts shall fix" ; "Failure to pay wages shall be punished with a fine of 10 times the wages or 6 panams". (Bk. III Ch. 13).

The State or the King, endowed lands to Physicians. "Superintendents, Accountants, Gopas, Sthanikas, Veterinary Surgeons, Physicians, horsetrainers, and messengers, shall also be endowed with lands which they shall have no right to alienate by sale or mortgage" (Bk. II Ch. I). In this context, the reference may be to the Royal Physicians, State Physicians, etc.

There was a separate category—"the physicians of the army". They were paid 2,000 panams per annum.

Duties, responsibilities and privileges.—The Royal Physicians had very heavy burdens and rare privileges. Before the king came to the Court, soon after getting up and receiving benedictions from priests and teachers, he had to see his physician in his private rooms. Even in the court, or having seated himself in the room where sacred fire was kept, the king "shall attend to the business of physicians and ascetics practising austerities and of those who are experts in witchcraft and yoga" (Bk. I Ch. 19). Narrating how kings were poisoned by their kith and kin and describing in detail how to detect poisons in food and poisoners, Kautilya cautions as follows, "Hence Physicians and experts capable of detecting poisons shall ever attend upon the King". Even with regard to the taking of medicines, the following rule had to be

observed, "Having taken out from the store-room of medicines that medicine, the purity of which has been proved by experiment and having himself, together with the decoctioner and purveyor tasted it, the physician shall hand over the medicine to the king". The same wholesome rule applied to liquor and other beverages given to the king (Bk. II Ch. 21). The ordinary physicians, too, had their professional responsibilities. It would surprise the modern reader to note that a form of compulsory notification (as under the latest Public Health Code) was insisted even in that remote age. "Any physician who undertakes to treat in secret a patient suffering from ulcer or excessive and unwholesome food or drink, as well as the master of the house (wherein such treatment is attempted) shall be innocent only when they (the physician and the master of the house) make a report of the same to either Gopa or Sthanika ; otherwise both of them shall be equally guilty with the sufferer." (Bk. II. Ch. 36).

Another equally modern conception relating to the professional liability for damages is reflected in the section on "Medical Practice" Students of medical history may note its resemblance to the code of *Hummurabi* of the ancient Babylonians. "Physicians undertaking medical treatment without intimating to the Government the dangerous nature of the disease, shall, if the patient dies, be punished with the first amercement. If the death of the patient under treatment is due to carelessness in the treatment, the physician shall be punished with the middlemost amercement. Growth of disease, due to negligence or indifference of a physician, shall be regarded as assault or violence." (Bk.IV. Ch.1).

Those who went out at night in order to attend to the work of midwifery or medical treatment, were allowed to go about their work, whereas others without any special type of urgent work or passes, were not permitted to move about in the middle of the night and were liable to be arrested. The medical profession was a privileged class.

Misuse of a Physician's Status.—The Guise of a Physician seems to have been very frequently employed, and permitted for certain methods of statecraft. This is another indication that the physician was respected,

believed and eagerly welcomed as a benefactor. "A spy under the guise of a physician may make a seditious minister believe that he is suffering from a fatal or incurable disease and continue to poison him while prescribing medicines and diet to him " (Bk.V. Ch.1).

"A spy under the garb of a physician may declare a healthy person of seditious character to be unhealthy and administer poison" (Bk.V.Ch.2). "The prince, hiding from his father or driven out by his father, may present himself when opportunity occurs, disguised as a physician or a courtbard and appeal to him" (Bk. 1.Ch.18) "Spies under the disguise of physicians acted as agents for the envoy in foreign kingdoms to ascertain the nature of intrigue prevalent among the parties and the loyalty or disloyalty of the people in the kingdom in which he was staying" (Bk. 1. Ch.16).

(*ii*) Hospitals, Herbariums, Pharmacy

Another interesting record preserved in this book is the allusion to the Hospitals in India in the 4th century B.C. Primers on the history of India never tire of telling that it was Asoka, the Great, that first provided facilities for the treatment of men and cattle. Kautiyla's statement should be sufficient to prove the existence of hospitals in India before the time of Asoka. Hospitals must have been more than curiosities or novel innovations, if a book on Arthasastra mentions the usual allocation of site in the Fort for the building of a hospital. "To the northwest, shops and hospitals". It would be interesting if one could conjecture the reason for this special site. But, one cannot help admiring the town planning experts, who went into such details, when even today in India expanding cities have no such clearcut plans.

Herbariums.—It was a common practice to encourage the cultivation and storage of plants of medicinal value. Such medicinal herbs as grow in marshy grounds were to be grown not only in grounds suitable for them but also in pots ; marginal furrows between any two rows of crops were utilised for planting medicinal herbs. Vegetables and roots were grown in the vicinity of wells. In the discussion on the two watery tracts, one of limited area, suitable for grains and another of vast area but productive of crops other than grains, the author adds

that the latter of the two was better, " inasmuch as it affords vast area to grow not only the spices and other medicinal crops but also to construct forts " (Bk. VIII Ch. 11).

Customs duty or toll on medicinal articles.

Roots and bulbs (generally useful as medicines).	1/6 part..
Articles like Arsenic sulphide (Heritala)	1/10 ,,
Red Arsenic (Mansila) Vermillion (Hingula) Metals (loha) Pungents (Katuka)	1/15 ,,
Scents, Medicines, Oils, Sugar, Liquor .	1/20 to 1/25 ,,

(Bk. II. Ch. 22)

It is worthy of note that Commodities intended for confinement of women were let off free of toll (Bk. II Ch. 21).

Adulteration punished.—Adulteration of scents and medicinal articles with similar articles of low quality was punished with a fine of 12 panams (Bk. IV. Ch. 2).

Variety of drugs.—Since the book is not a treatise on Medicine, no direct references occur to the actual preparation of medicines from the various ingredients. But indirect evidence is abundant to suggest that the people had a large variety of drugs and also had knowledge of many interesting pharmaceutical processes and procedures. The section on mining operations and manufactures indicates the state of knowledge not only in mining, identifying ores, refining metals but also in softening metals, distillation and condensation of mercury, formation of various tpes of alloys and many other metallurgical processes, that would surprise the reader. All this work was under the direction of a superintendent of mines. In addition, there was a superintendent of goldsmiths to test the purity of the metals (Bk. II. Ch. 12, 13, 14). The superintendent of forest produce collected not only timber but also many useful articles especially medicines and poisons. " Bulbous roots and fruits are in the group of medicines." The following vegetable

poisons were collected. "Kalakuta, vatsanabha, halahala, meshasring, musta, kustham, ahavihas, vellitaka, guarardra, balaka, markata haimavata, kalingaka, daradaka, kolasaraka, ustraka, etc.," Likewise, "snakes and worms kept in pots formed another group of poisons." The forest produce included metals, like iron, copper, lead, tin, etc., and animal substances like bones, bile, teeth, horns, hoofs of various animals, beasts, birds and reptiles (Bk. II Ch. 17). Among the articles to be stored in the fort in such quantities as could be enjoyed for years together without feeling any want are mentioned "Medicinal articles and poisons." "Of such collections, old things shall be replaced by new ones when received" (Bk. II. Ch. 4).

There was a superintendent of storehouses to store articles brought in by other departments such as the agricultural department. "Of the store thus collected half shall be kept in reserve to ward off calamities of people and only the other half used. Old collections shall be replaced by new supplies." An idea of the type of articles stored is given by the long lists.

Classification of Drugs.—The phraseology is reminiscent of the Ayurvedic classification and ancient sanscrit medical works.

1. Oils (Sneha)—including serum of flesh, pith of plants, etc.

2. Sugar (Kshira)—including sugarcandy, jaggery and decoction of sugar.

3. Salt (Lavana)—Saindhava (rock salt), Yavakshara (nitre), Sauvarchal, Udbedaja, Samudra, etc.

4. Madhu (Honey)—grape juice.

5. Acid fruits—Myrobalam, etc.

6. Pungent substances (Tikkavarga) long pepper, black pepper, ginger, kiataikta, damanaka, maruvaka, sigru, etc., with their roots.

7. Edibles (Sakavarga)–Dried fish, bulbous roots, fruits, vegetables..

8. Astringents (Suktavarga)—Mixtures of juice of sugarcane, honey, etc., and of essences of fruits, jambu, myrobalam (Bk. II. Ch. 15).

Preparation of spiritous medicines.—Families were allowed to manufacture " Arista " for use in diseases and the superintendent of liquor collected licence fees from these people. The preparation of various kinds of " Aristas " for various diseases had to be learnt from physicians. It is stated that one hundred palas of kapitha, 500 palas of phanita and one prastha of honey form " Asava ". Many interesting instructions are given to prepare a variety of medicinal drinks as well as intoxicating drinks (Bk. II. Ch. 25).

(*iii*) References to diseases, medicines and concessions to the sick.

Diseases and Medicines.—Apart from the scattered references in the book to medicines and diseases, a whole chapter (Bk. XIV. Ch. 6) is devoted to "remedies against the injuries of one's own army ". Herein, Kautilya deals with various preparations (with their ingredients) used as remedies against poisons and poisonous compounds, applied by an enemy against one's army and people. The following are mentioned :

1. Decoctions which are applied for washing off bad effects of poisons.
2. Mixtures for removing the bad effects of poisoning by the madana plant.
3. Mixtures to remove madness.
4. Mixtures applied through the nose as " nosedrops " to remove leprosy.
5. Mixtures to remove consumption.
6. Nosedrops to remove headache and other diseases of the head.
7. Mixtures (with doses) to resuscitate persons who fall down senseless, when beaten or by drowning or poisoning.
8. Strange and miraculous medicines are also mentioned such as a powder for enabling one to see clearly in darkness and a powder enabling persons to fast for a month.

9. " Sale of bipeds (including human beings) as strong healthy and clean, though they are unclean or actually suffering from leprosy and other diseases, shall be punished with a fine " (Bk. III Ch. 2).

10. Allusion also occurs to lunatics or mad people attempting to enter a house by force. (Bk. IV Ch. 13).

11. Lunacy, leprosy and impotence are mentioned in the section on defamation. (Bk. III Ch. 18)l

12. In addition to drugs, mantras and other magical procedures were frequently used for protecting oneself and for hurting the enemy.

Some types of deformities.—In describing the daily routine of the king, the book tells that he had to pass through a series of rooms on getting up. In the third room, he should be received by " crooked and dwarfed persons.' Whether they were so congenitally or as a result of acquired disease, and what the actual types were can only be vaguely guessed, from the examination of the series of panels of ancient paintings or sculptures, depicting court scenes and the harems of kings, in which crooked and dwarfish persons are shown. In referring to the spies, the hunchbacked, the dwarf, the pigmy, the Eunuch the deaf, the dumb, the idiot and the blind are mentioned (Bk. I Ch. 12).

Privileges and concessions to the sick.—The king was personally " to attend to the business of gods, of brahmans learned in the veda, of the young. The aged and the afflicted and helpless " (Bk. I. Ch. 19). Judical officer dealing with criminal offences should not inflict fines and punishments of the same kind or degree on all people alike; among the people who should be shown mercy were included not only pilgrims and ascetics but also persons suffering from hunger, thirst, fatigue and disease.

Similarly, though there may be no actual complaints from the victims, the judges themselves had to settle transactions which pertain to gods, brahmans, minors, aged persons and diseased persons (Bk. III- Ch. 20). Labourers suffering from disease were also to be shown concession or allowed to have the work done by a substitute (Bk. III. Ch. 14). The afflicted, the children

and the aged were provided with free passes to cross rivers. " On the days to which birth star of the king was assigned etc., such prisoners as are young, old or diseased, helpless shall be let out from jail" (Bk. II. Ch. 36). Though torture to elicit confession was officially approved, a sensible restriction was added " The aged, the afflicted, persons under intoxication,lunatics, persons suffering from hunger, thirst or fatigue, persons who have taken more than enough meal, or persons who were very weak—none of these shall be subjected to torture" (Bk. IV Ch. 8). But these privileges were occasionally abused for statecraft. The book states that spies might also go out suddenly under the pretext of long-standing disease, or lunacy (Bk. I. Ch. 12).

CHAPTER II

(i) Regimen for the Royalty and Royal Household

Baths, dressing and toilet.— " Having cleaned their person and hands by fresh bath and put on newly washed garments, servants in charge of dresses and toilets shall serve the king with dresses and toilets received under the seal from the officers in charge of the harem. Dancing women shall do the duty of bath-room servants, shampooers, bedroom servants etc. While presenting to the king, water, scents, fragrant powder, dress and garlands, servants along with the other dancers, shall first touch these things by their eyes, arms and breasts. "

Mental hygiene.—Under the heading "restraint of the organs of sense" the book states that study and discipline depended on the success of this restraint. Such a restraint could be enforced by abandoning lust, anger, greed, vanity, haughtiness (*mada*) and overjoy (*harsha*). Absence of discrepancy in the perception of sound, touch, colour, flavour and scent, by means of the ear, the skin., the eyes, the tongue and the nose, is what is meant by the restraint of senses. "Whosoever has not his senses under his control will soon perish. "

" The sole aim of all the sciences is nothing but the restraint of senses. " Kautilya further lays down valuable principles of education. "There can be no greater crime or sin than making wicked impressions on an innocent mind. Just as a fresh object is stained with whatever is brought in close association, so a prince is apt to regard as scientific injunctions, all that he is told of. Hence, he shall be taught only of righteousness and wealth but not of nonrighteousness. " (Bk.I. Ch.6).

Social Hygiene.—One of the ways of ruining the kingdom of the enemy was to influence the princes and to make them dissipate their lives by sensual excesses. Classmates and spies, allure the prince towards hunting, gambling, liquor and women. "This is death in life; for no sooner is a royal family with a prince or princes given to dissipation, than it persishes like a worm-eaten

piece of wood." Some interesting methods for the training and correction of the prince may be noted. "When under temptation of youth he turns his eyes towards women, impure women, under the guise of of Aryas, shall, at night and in lonely places, terrify him. When fond of liquor, he shall be terrified by making him drink such liquor as is adulterated with narcotics.'

It was also enjoined that the king should see the queen only when her personal purity was vouchsafed by an old maid servant. He should not touch any woman unless he is appraised of her personal purity. " The king shall keep away his wives from the society of ascetics, buffoons and outside prostitutes. Women of high birth should not see royal ladies. Only appointed midwives should see them. Prostitutes with personal cleanliness effected by fresh bath and with fresh garments shall attend the harem." (Bk. I Ch.20).

Eugenics.—Recognising the importance of good progeny to the royal family, the following ante-natal precautions were taken: "Hence, when the queen attains the age favourable for procreation, the priests shall offer to Indra and Brihaspati the requisite oblations. When she is big with child, the instructions of midwifery with regard to gestation and delivery shall be observed. After delivery, the priests shall perform the prescribed purificatory ceremonials." If the king had only a son with "stagnant intelligence" (idiot) or one of perverted mind, attempts were made to procreate a son to son; or sons may be begotten on the king's daughters. When the king was too old or diseased to beget sons, "he may appoint a maternal relation or a blood relation of his or any one of his neighbouring kings, possessed of good qualities, to seed in his own field (to beget a son on his wife)". (Bk. I Ch.17).

Domestic hygiene.—In the construction of the harem, directions are given not only for the selection of a proper site and the provision of intricate under-ground passages and secret doors, but special emphasis is laid on precautions against fire and poisonous snakes. The walls of the harem were made of mud mixed with ashes, produced by lightning and wetted in hail water. Poisonous snakes were kept away by planting certain herbs and plants. Cats, peacocks and mongooses etc.,

were kept to eat up the snakes. Parrots, minas, etc., which shriek when they perceive the smell of snake poison were used as spotters or detectors; "The heron (*Crouncha*) swoons in the vicinity of poison; the pheasant (*Jivanjivaka*) feels distress; the youthful cuckoo (*Mattakokila*) dies; the eyes of the partridge (*Chakora*) are reddened."

The Royal Kitchen.—The head cook had to supervise the preparation of varieties of dishes. The king should partake of the dishes after making an oblation, out of them, first to the "fire and then, to the birds" (to test whether the food was poisoned). "Physicians and experts capable of detecting poison shall ever attend upon the king." With regard to the medicines, liquor and beverages for the king, the following practice was prescribed: "Having taken out from the store-room of medicines that medicine the purity of which has been proved by experiment and having himself together with the decoctioner and the purveyor (*Pachaka and Poshaka*) tested it, the physician shall hand over the medicine to the king." (Bk. I. Ch.20).

Sick room and Labour room in the Harem.—"On one side in the rear of the harem, there shall be made for the residence of women compartments provided not only with all kinds of medicines, useful in midwifery and diseases, but also with well-known potherbs and water reservoirs." (Bk.I. Ch. 20). While the royal harem contained a special apartment for labour, ordinary house-holders were permitted to put up a temporary structure for 10 days for the confinement of women. (Bk. II. Ch. 8).

CHAPTER III

(i) Health and Weflare of the Common People.

Orphanages.—Men or women neglecting to maintain children were punished. The State had to give accommodation and food to the orphans. These children were put to the study of sciences and trained to be spies. (Bk. II.Ch.1) .

Infirmaries, Poor houses and provision of work and wages.—The State also maintained the aged, the infirm, (Bk. II. Ch. 1) the afflicted and the helpless. Widows, cripples, women, girls, old women, servants of the king, mothers of prostitutes and old prostitutes were employed to cut wool, fibres, hemp, etc. "Those women who do not stir out of their houses, those whose husbands are gone abroad, cripples and girls, were provided with work (spinning) in due courtesy, through the medium of maid servants. " (Bk. II. Ch.23). Those who did greater work were presented with oil and dried cakes of myrobalam fruit.

Nurses.—References occur to nurses in the section on rules regarding "Slaves and Labourers." (Bk. III. Ch. 13). In another context, further light is thrown on the manner in which the ranks of these were recruited. "She (a prostitute) who has lost her beauty shall be appointed as a nurse (*Matrika*) ." (Bk. II. Ch.27).

Protection and health of workers.—"If a healthy labourer deserts his company after work has been begun, he shall be fined 12 panas." (Bk. III. Ch. 14). "Employing a slave to carry the dead or sweep away ordure, urine or the leavings of food ; keeping a slave naked, or hurting or abusing him, or violating the chastity of a female slave, shall cause the forfeiture of the value paid for him or her."(Bk. III Ch. 13). "Labourers suffering from diseases should be shown some concessions or be allowed to get work done by a substitute." (Bk. III. Ch.14)

Child labour discouraged.—If a slave who is less than 8 years old and who has no relative is employed in mean

avocations against his will, the master shall be punished with the first amercement. (Bk. III. Ch. 13).

Maternity benefits for female slaves and Labourers.—Anyone attempting to cause abortion to a slave by medicine was punished. (Bk. III.Ch.20). If a pregnant female slave is pledged or sold without any provision for her confinement, the master shall be punished. (Bk. III Ch. 13). When a child is begotten through a female slave by her master, both the child and its mother shall at once be regarded as free. (Bk. III. Ch. 13).

Facilities and aid during confinement of pregnant women.—Commodites (Like medicines etc.) intended for the confinement of women were let off, free of tolls. (Bk. II. Ch. 21). Women were permitted to go to the house of kinsmen under the following circumstances: "death, disease, calamities, confinement of women." "Whoever prevented her going out, under such circumstances, shall be fined 12 *Panas*. If the women conceals herself she shall forfeit her endowment." (Bk. III. Ch.4). The State had to provide subsistence for helpless women when they were pregnant and also to the infants and children they gave birth to. (Bk. II Ch.1). Women that were pregnant were given free passes to cross rivers in boats. Those persons who went out at night in order to attend to the work of midwifery were not to be arrested for moving about at night. (Bk. II. Ch.36). Allusions occur to midwives.

CHAPTER IV

(i) Town Planning, Precautions Against Fire Etc.

Town Planning.—In the sections dealing with the construction of various types of forts (Bk. I Ch. 3), in addition to precautions and constructions of military and strategical importance, the book gives clear and detailed instructions regarding the formation and width of roads, streets and also of ponds. The next chapter entitled " Buildings within the Fort " begins with the statement that demarcation of the ground inside the fort was to be made by 3 royal roads from west to east and 3 from south to north. Provision had to be made for separate roads for different purposes and the width varied according to the importance and purpose of the road. " Chariot roads and royal roads were 24 feet wide. Roads leading to military stations or burial ground were 48 feet in width. Roads for cattle had to be 6 feet in width." After laying down the rules regarding the formation of roads, the book proceeds to allocate areas for different purposes. In Book II Ch. 7 there is a suggestion for a superintendent of building sites. Inside the fort, and to the north from the centre of the ground, was to be built the King's palace. The Royal teachers, priests, water-reservoir and ministers, were to occupy sites to the north-east of the royal palace. The Royal kitchen and store-house were to be located on a site to the south-east. The liquor house was to be in the centre of the town. The most interesting regulations in this town-planning scheme are those setting apart the southern part of the fort for those who traded in cooked rice, liquor and flesh, and for the prostitutes and musicians (Bk. II Ch. 4), and the location of burial or cremation ground to the north or east. " Science of Buildings " occupied a prominent place in the life of the people. In addition to the description of the actual technique and material for construction, the treatise insists that all permanent houses should be provided with a dung-hill, water-course and a well. Violation of this rule was punishable with first amercement. Between the houses, an adequate intervening space was to be left, except where houses were separated by a royal road or high road. Building of doors and windows facing those of other houses was forbidden. Owners of houses

had to avoid whatever was injurious to the public (Bk. IV. 8).

Fire-Fighting Equipment in Buildings.—"The store house, the trading house, the court, the office of the ministers and the jail—all these buildings had to be provided with halls, pits, (privies?) water-wells, bathrooms, remedies against fire and poison, cats and mangooses, etc." (Bk. II. Ch. 5).

Precautions against fires :—

" Kindling of fire shall be prohibited during the two middle most parts of the day (time being divided into four equal parts during the summer). A fine of 1/8th of a *Pana* shall be imposed for kindling fire at such a time."

" Masters of houses may carry on cooking operations outside their houses.

" If a house-owner is not found to have ready with him, five water-pots (*Pancha Ghatika*), a kumbha, a drona, a ladder, an axe, a winnowing basket, a hook (such as is used to drive an elephant), pincers, (*Kanchagrahini*), and a leather bag (*Drifi*), he shall be fined 1/4th of a *Pana.*

" They shall also remove thatched roofs. Those who work by fire (black-smiths) shall all together live in a single locality.

" Each house-owner shall ever be present (at night) at the door of his own house.

" Vessels filled with water shall be kept in thousands in a row without confusion not only in big streets and at places where four roads meet but also in front of the royal buildings.

"Any house-owner who does not run to give help in extinguishing the fire of whatever is burning shall be fined 12 *Panas ;* and a renter (*Avakrayi, i.e.*, one who has occupied a house for rent) not running to extinguish fire shall be fined 6 *Panas.*

"Whoever carelessly sets fire (to a house) shall be fined 54 *Panas ;* but he who intentionally sets fire (to a house) shall be thrown into fire."

CHAPTER V

(*i*) General Sanitation and early Attempts to enforce a Public Health Act.

Water supplies, etc.—A water reservoir was located east by (north) north-east of the palace. The buildings in the fort were provided with wells. As far as the public and the poor were concerned, a well was to be dug for every 10 houses. In addition, the king " shall construct reserviors filled with water from perennial sources or from other sources." Or, he might provide with sites, timber, etc., those people who constructed reserviors. (Bk. II. Ch. 1). Protection for water supply systems was also provided. "Whoever excretes faeces in places of pilgrimage, reserviors of water, temples, and royal buildings shall be punished with fines rising from one Pana and upwards in the order of offences ; but when such excretions are due to the use of medicines or disease, no punishment shall be imposed." (Bk. II. Ch. 36.) One illuminating sidelight is thrown by a casual remark in connection with winning over the factions in the State. The words "just as a reservior of water belonging to *Chandalas* is serviceable only to *Chandalas* but not others." (Bk. I Ch. 14) indicate separate wells for different castes.

Drains.—From each house, a water course of sufficient slope and length was to be constructed, so that water could either flow in a continuous line or fall from it into the drain. Violation of this rule was also punishable with a fine. (Bk. III. Ch. 8).

Scavenging—The existence of scavengers for sweeping the city is also indicated. (Bk. IV. Ch. 1). Under the general title of artisans, the book mentions scavengers, medical practitioners, musicians." etc.

Prevention of nuisance.—Strict rules were laid down to prevent ignorant or careless people, causing harm or ill-health to the citizens. "If a pit or water-course, ladder, or dung-hill or any other part of a house, offers or causes annoyance to outsiders, or in any other way obstructs the enjoyment of others, or causes water to

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collect and thereby injures the wall of a neighbouring house, the owner shall be punished with fine of 12 *Panas.* If the annoyance is due to faeces and urine, the fine shall be double. The water course (gutter) shall offer free passage for water. Otherwise the fine shall be 12 *Panas.*" (Bk. IV. Ch. 8). In another part of the book, while dealing with the duties of the city superintendent the following rules are laid down: "Whoever throws dirt in the street shall be punished with a fine of 1/8th *Pana;* Whoever causes mire or water to collect in the street, shall be fined ¼ *Panas*; who ever commits the above offences in the King's Road, shall be punished with double the above fines." The duties of the city superintendent included detection of noctural nuisances and inspection of water reservoirs, of roads and of hidden passages out of the city. He was fulfilling the role of the Municipal Health Officer. (Bk. II. Ch. 36).

Inspection of Slaughter Houses and meat.— Stringent rules and strict supervision attempted to prevent adulteration of food-stuffs. There was also a superintendent of slaughter houses, who enforced the following orders:

Cattle such as calf, a bull or milch cow shall not be slaughtered. He who slaughters them shall be fined 50 Panas. The flesh of animals killed outside the slaughter house, headless, boneless flesh, rotten flesh, or flesh of animals which have suddenly died shall not be sold.' Butchers were to sell fresh flesh. Those using false balance were punished.

Disposal of the dead.

Apart from the scattered references to the separate roads for carrying the corpses, separate sites for burial or cremation, and the special arrangements for the disposal of the dead bodies of travellers and strangers, the following rules indicate the thought and care bestowed on the subject: " Whoever throws inside the city the carcass of animals such as that of a cat, dog, mongoose or snake shall be fined 3 *panas ;* of such animals as that of an ass, camel, mule or of cattle shall be fined 6 *panas ;* and if human corpses, shall be punished with fine of 50 *panas.*" " When a dead body is taken out of a city through a gate other than the usual or prescribed one or

through a path other than the prescribed one, the first amercement shall be imposed; and those who guard the gates through which the dead body is taken shall be fined 200 *panas*. When a dead body is interred or cremated beyond the burial or cremation grounds, a fine of 12 *panas* shall be imposed." (Bk. II. Ch. 36).

Census.

Under the general supervision of the Collector-General the *Sthanikas* (District Officers) and *Gopas* (village Officers) had to keep the records of the following type of information.

"Also having numbered the houses as tax-paying and non-taxpaying , he shall not only register the total number of inhabitants of all the four castes in each village but also keep an account of the exact number of cultivators, cowherds, artisans, labourers, slaves and biped and quadruped animals. He shall also keep an account of the number of the young and old men, that reside in each house, their history, occupation, income and expenditure. Spies deputed by the Collector-General acertained the validity of the data, collected by the Village, District Officers." (Bk. II. Ch. 35).

A *Gopa* or a *Sthanika* shall also know not only the accounts of the villages or districts but also the caste, the gotra, the occupation of both men and women in the households, and their income and expenditure. (Bk. II. Ch. 36).

(*ii*) Control of Prostitution

The conception of an appointment called the Superintendent of Prostitutes is itself an outstanding achievement of the ancient Indian civilisation. His duties were multifarious.—registration, determination of earnings, adjudicating cases, etc. (Bk. II Ch 27) "A public woman shall surrender her person as agreed upon but insistence on the observance of any agreement which is ill-considered and improper shall not be successful.," (Bk. III Ch. 13). Every prostitute had to pay every month twice the amount of a days' earning to the Government. The State maintained all those that taught the prostitute arts such as singing, playing on the musical

instruments, dancing, acting, painting, manufacture of scents and garlands, shampooing and the art of attracting and captivating the minds of others. Many interesting rules for the protection of the prostitutes against rape and abduction were in force. One almost modern notion may be quoted. " When in her own house, a prostitute deprives her paramour of his enjoyment, she shall be fined 8 times the fees she charges, unless the paramour happens to be unassociable, on account of disease and personal defects,. " When a man has relationship with a prostitute against her will or with a prostitute girl he shall be punished with the highest amercement. But if he has relationship with a willing prostitute who is underaged he shall be punished with the first amercement.

" When a prostitute does not yield her person to any one under the orders of the king, she shall receive 1000 lashes with a whip. When having received the requisite amount of fee, a prostitute dislikes to yield her person, she shall be fined twice the amount of fees." (Bk. II. Ch. 27).

CHAPTER VI

(i) NATIONAL CALAMITIES

The chapter dealing with remedies against national calamities is highly interesting and throws much light on the state of the society and the common sufferings of the people in the Mauryan Empire. Eight kinds of providential visitations are mentioned. The book mentions them in the following order :—

1. Fires.	2. Floods.	3. Famines.	4. Rats.
5. Tigers.	6. Demons.	7. Snakes.	8. Epidemics.

The King was expected to protect the people against all these dangers. Detailed rules and instructions are given, some of which may be briefly noted here.

Epidemics.—Many passages in the book refer to epidemics. The king is advised to avoid taking possession of any country which is harassed by frequent visitations of famine and pestilences (Bk. II. Ch. 1). The property of those who died falling victims to epidemics, leaving no sons went to the State. In one context dealing with calamities and contrasting the effects of pestilence and famine, the book adds "Pestilence brings all kinds of business to a stop by causing obstruction to work on account of disease and death among men and owing to the flight of the servants." Among the national and providential calamities, pestilences are mentioned. One particular epidemic disease mentioned by name is called *Maraka* (because it killed people) (Bk. VIII. Ch. 4). Pestilential disease is one of the eight national calamities against which the king should protect his kingdom. "Such remedial measures as will be treated of in the 14th book shall be taken against pestilences. Physicians with their medicine, and ascetics and prophets with their auspicious and purificatory ceremonials shall also overcome pestilences. The same remedial measures shall be taken against epidemics (*Maraka*). Besides the above measures, oblations to gods, the ceremonial called *Mahakachchabardhana* "milking the cows on cremation or burial grounds, burning the trunk of a corpse, and spending

nights in devotion to gods, shall also be observed." (Bk. IV. Ch. 3).

Demons.—A modern reader would laugh and ridicule the idea of demons. But he should have a knowledge of the history of ancient thought and civilisation to appreciate the prominent place given to demons in primitive society and medicine. "Persons acquainted with the rituals of *Atharvaveda* and experts in sacred magic and mysticism shall perform such ceremonials, as ward off the danger from demons.'

Another procedure mentioned bears a close resemblance to the votive offerings in the ancient Egyptian and Grecian temples (Aesculapian shrines).," On full moon days, the worship of *Chaityas* may be performed by placing on a verandah offerings such as an umbrella, the picture of an arm, a flag and some goat's flesh." "In all kinds of dangers from demons, incantations offering cooked rice should be performed. The king should always protect the afflicted among his people as a father his sons." The dangers from demons must have included a variety of conditions from hysteria to delirium and all forms of lunacy. *Bhutavaidya* was a very important branch of medicine.

Snakes.—There were probably numerous snakes and everywhere danger and death from snakes would appear to have been very common. Phrases such as "fear from a lurking snake,""a hidden snake bites and emits poison over whatever alarms it" are frequent. History records that, when Alexander the Great invaded India and encamped near Takshasila, the skilled medical men from Greece could not cure cases of snake-bite, and that he had to seek the assistance of the local Indian physicians for the treatment of snake-bites in his army. Treatment of snake-bites was so necessary and so miraculous that "*Sarpavaidya*" was raised to the dignity of a branch of study in ancient Indian curriculum along with *Bhutavaidya* (treatment of demons),. Anti-snake operations were to be carried out according to the following directions. "When there is fear from snakes, experts in applying remedies against snake poison shall resort to incantations and medicines; or they may destroy snakes in a body; or those who are learned in *Atharvaveda* may perform

auspicious rites." Probably, Janamejaya's "*Sarpayaga*" is not a fiction.

Rats.—From the importance given in this treatise, even these small animals were a source of great hardship. To ward off danger from rats, cats and mongooses were let loose; grains mixed with the milk of the "milkhedge plant" or other stuff were left on the ground. Ascetics and prophets were to perform auspicious ceremonials. One would like to ask :—"did plague occur and was the association with rats known?"

Tigers.—The carcasses of cattle mixed with the juice of the *Madana* plant or carcasses of calves filled with the juice of the *Madana* and *Kodrava* plants, were thrown in suitable places to destroy tigers. Hunters were encouraged to kill tigers by offering rewards. Negligence to rescue a person under the clutches of a tiger was punished with a fine. Probably, forests surrounded the inhabited localities, towns or villages. It is added that similar measures might be taken against the inroad of beasts, birds and crocodiles. No reference occurs however to mad dogs.

Famines.—During famines, the king might emigrate to a kingdom with abundant harvest or go to the seashore or banks of rivers. He might help his subjects to grow grains, vegetables, roots and fruits, wherever water was available. He might, by hunting and fishing, on a large scale, provide people with wild beasts, birds, fish, etc. He might provide his people with seeds and provisions. He might distribute his private collection of provisions or the hoarded provisions of the rich or seek aid from friendly kings.

Floods.—During the rainy season villagers living on the banks of rivers were to remove themselves to upcountries. They were to provide themselves with wooden planks, bamboos and boats. They were by means of bottle-gourds, canoes, trunks of trees or boats, to rescue persons who were being carried off by floods. Persons neglecting rescue were fined. Rivers were worshipped. Experts in sacred magic and mysticism and persons learned in *Veda* performed incantations against heavy rain.

Fires.—Rigorous steps were taken to prevent fire in the harem. The public buildings in the fort were all provided with remedies against fire. "During summer, villagers shall carry on cooking operations outside. Or, they shall provide themselves with the ten remedial instruments." In the city or the capital, the city superintendent had to see that the prescribed regulations were observed.

CHAPTER VII

(*i*) FOODS, DRINKS AND RATIONS.

Variety.—A list of articles mentioned by Kautilya serves as an index of the variety and the adequacy of food articles. He mentions Grams, oils (including clarified butter), serum of flesh, *pith* or sap of plant, jaggery, granulated sugar, sugar candy, honey of the bees, juice of the grapes, various kinds of salts (those from the mines and those from the sea), fruits, vegetables, fish and spices. The various practices employed in the preparation of food stuffs for daily consumption are also indicated. Rice was pounded, pulses divided, corn and beans fried, and flour manufactured by specially trained workers. Oil was extracted by employing shepherds and oil makers. Sugar was manufactured from sugar-cane. The Superintendent had to personally supervise the increase or diminution sustained in grains when they were pounded, frayed or reduced to flour or fried or dried after soaking in water. Minute and detailed rules are given indicating the actual edible fractions in grains and pulses (like rice, millet, black-gram). The treatise also mentions the probable increase in quantities when rice and other articles are cooked or when barley flour is baked, or when grains and seeds are moistened or soaked and fried.

Knowledge of edible fractions.—" The essential part (sara, *i.e.*, that which is fit for food) of kodrava (paspalam Scrobiculatum) and of vrihi (rice) is one half; ? that of sali (a kind of rice) is (half) less by one eighth part; that of varaka (Phraseolus Trilobus) is (half) less by one third part; that of priyangu (panic seed or millet) is one half; that of chamasi (barley), of mudga (Phraseolus Mungo) and of masha (Phraseolus Radiatus) is (half) less by one eighth part; that of sabya (simbi) is one half; that of masura (Ervum Hirsutum) is (half) less by one-third part.

Increase on cooking, etc.—Raw flour and kulmasha (boiled and forced rice) will be as much as one and a half of the original quantity of the grains.

Barley gruel, as well as its flour baked, will be twice the original quantity.

Kodrava (Paspalam Scrobiculatum), varaka (Phraseolus Trilobus) udaraka (Panicum) and priyangu (millet) will increase three times the original quantity when cooked. Vrihi (rice) will increase four times when cooked. Sali (a kind of rice) will increase five times when cooked.

Grains will increase twice the original quantity when moistened; and two and a half times when soaked to sprouting condition.

Grains when fried will increase by one fifth the original quantity, leguminous seeds (kalaya) when fried, will increase twice the original; likewise rice when fried. (Bk. II, Chap. XV).

Adulteration punished.—"Adulteration of grains oils, etc., with similar articles of inferior quality shall be punishable with a fine of 12 panas ". (Bk. IV. Ch. 2).

Methods of preserving.—Methods of storing of grains, oils, salts and jaggery are mentioned.

Rice— Rice was probably the staple article of diet though other grains took their place under different circumstances and in certain regions. It is somewhat surprising to know that the Mauryan Empire had fixed regular rations of rice and other articles. The code describes the quantity of rice supplied or permitted for each man, woman and child. The nutritional experts will also note with interest that one of the prevalent methods of preparing rice was "*Boiling and Forcing*". Rice was also fried and rice cakes were popular. Bran and flour were given to slaves and labourers. (Bk. II, Chap. XV).

Milk and milk products. An interesting record on the question of milk may be quoted : " One drona of milk when churned yields one prastha of butter; the same quantity of buffalo's milk will yield 1/7 *prastha* more; and the same quantity of the milk of goats and sheep will yield ½ prastha more. In all kinds of milk the exact quantity of butter shall be ascertained by churning for, the increase in the supply of milk and butter depend

on the nature of the soil, the quality and quantity of fodder and water." (Bk. II Ch. 29).

The cowherds were allowed to keep butter-milk and coagulated milk or cheese for their families.

The Superintendent of Slaughter Houses.—The existence of an appointment called the Superintendent of Slaughter Houses will indicate the high-water mark of Public Health Legislation and Administration in ancient India. Horses, bulls, monkeys, deer, fish in lakes, game birds etc., were under state protection. Entry into forest preserves was forbidden. Of beasts of prey that have been captured, the Superintendent shall take 1/6 as toll; of fish and birds 1/10; of deer 1/16. The rules for selling meat were as follows :

" Butchers shall sell fresh and boneless flesh of beasts, just killed. If there is any diminution due to false balance, they shall give 8 times the diminution.

" Cattle such as the milch-cow, bull or calf shall not be slaughtered. He who slaughters them shall be fined 50 panas."

" The flesh of animals which have been killed outside the slaughter houses, headless, legless and boneless flesh, rotten flesh, and the flesh of animals which have suddenly died, shall not be sold. Otherwise, a fine of 12 panas shall be imposed." (Bk. II Ch. 26).

Fisheries, firewood and vegetables.—The king was also expected to exercise his right of ownership with regard to fishing and trading in vegetables. Fishermen had to give 1/6 of the haul as fees for a fishing licence. Vegetable dealers, fishermen and firewood dealers and those who supplied villages in marshy districts with the necessities of life, were allowed to cross rivers at any place and at any time. The cities had " sellers of cooked flesh, flavoured rice, etc."

Superintendent of Liquor.—This official carried on and controlled the manufacture and sale of liquor of various kinds. Varieties of drinks, modes of preparation and rules for selling are given in detail. One interesting provision (restriction) may be quoted here as an example

of the vigilance and care of the lawgivers of the age. Temperance was legally enforced. " Lest the workmen spoil the work on hand and Aryas violate their decency and virtuous character and lest firebrands commit indiscreet acts, liquor shall be sold to persons of well known character in such small quantities as ¼ or ½ *kudumbs*. Those who are well known and of pure character may take liquor out of the shop." (Bk. II Ch. 25).

These stringent rules were relaxed on special occasions. During festivals, fairs and pilgrimages, right of manufacture of liquor for 54 days was allowed.

A square meal.

" One prastha of rice, pure and unsplit, one fourth prastha of supa, and clarified butter or oil equal to one fourth part of supa will suffice to form one meal for an Arya.

" One sixth prastha of supa for a man; and half the above quantity of oil will form one meal for the low castes (avarna).

" The same rations less by one fourth the above quantities will form one meal for a woman; and half the above rations for children.

" For dressing twenty palas of flesh, half a kutumba of oil, one pala of salt, one pala of sugar (kshara), two dharanas of pungent substances (katuka, spices) and half a prastha of curd will be necessary.

For dressing a greater quantity of flesh, the same ingredients can proportionately be increased.

For cooking sakas (dried vegetables) one and a half times as much of the above substances are to be added.

For dressing dried fish, twice as much of the above ingredients are to be added. (Bk. II. Ch. 15).

CHAPTER VIII

(i) Medical Jurisprudence (Forensic Medicine).

Inheritance and disease—1. An impotent eldest son was to have only 1/3 of the special share usually given to the eldest.

2. Eunuchs, idiots, lunatics and blind people had no share in the property.

3. If the idiots had wives with property, their issues who were not equally idiots, were to share the inheritance. (Bk. III. Ch. 5)

Disease and Testamentary capacity.—Any agreement entered into, by a dependent, a minor son, a wife, a cripple, or an afflicted person, shall not be valid.

Any agreement shall be viod, if a person was at the time of making the agreement under anxieties or intoxication, or if he was a lunatio or a haunted person.

There were two kinds, of agreements which were held to be valid though the agreements were entered into, inside the house.

1. Those in which were concerned women who were either afflicted with disease or also, do not stir out ;

2. Those entered into by persons who are not known to be of unsound mind (Bk.-III. Ch. 1.)

The following types of persons were unacceptable as witnesses except in cases of transactions in one's own-community '

Lepers, persons suffering from bodily eruptions (Small-pox, Measles, Syphilis ? etc.), the blind, the deaf and the dumb.

Defamation and Testimony of Physicians.

The section dealing with defamation is really very interesting and even amusing.

Calling a "deformed man by his right name, such as "the blind" the lame" etc., was punishable with a fine of 3 panas. If the blind and the lame were insulted with ironical expressions, such as "a man of eye"etc., the fine was 12 panas.

When a person was taunted for leprosy, lunacy, impotency and the like, the offences were punished with fixed fines.

If the abuse was due to carelessness, intoxication or loss of sense, the fine was halved.

Then the most interesting statements occur,

"As to the reality of leprosy and lunacy, physicians or neighbours shall be authorities.

"As to the reality of impotency, women, the scum of urine, or the low specific gravity of faeces (sinking of faeces in water) shall furnish the necessary evidences." (Bk. III. Ch. 16).

(*ii*) ASSAULTS.

A whole chapter, Book III, Chapter 19, is devoted to the discussion of assault which is defined as "Touching, Striking or Hurting".

Touching included catching by the legs, hands or hair, dragging, and also smearing with saliva, urine and or faeces. Varying degrees of fines were levied according to the nature of the offence. If the offence was due to carelessness, intoxication or loss of senses, the fine was halved.

Striking with the hand shall be punished with fines below 3 panas, with the leg, twice as much as the above fine. Striking with an instrument so as to cause swellings, was to be punished with the first amercement, and striking so as to endanger life, was to be punished with the middlemost amercement.

Hurts and Wounds.—More elaborate rules were framed for dealing with hurt. In the absence of witnesses, the nature of the hurt and other circumstances connected with the quarrel were taken as evidence.

"Causing a bloodless wound with a stick, mud, a stone, an iron bar, or a rope shall be punished with a fine of 24 panas. Causing the blood to gush out, excepting bad or diseased blood, shall be punished with double the fine".

"Beating a person almost to death, although without forcing out blood, breaking the hands, legs, or teeth, tearing off the ear or the nose, or breaking open the flesh of a person except in cases of ulcers or boils shall be punished with the first amercement. Causing hurt in the thigh or the neck, wounding the eye, or hurting so as to impede eating, speaking, or any other bodily movements, shall not only be punished with the middlemost, amercement, but also be made liable to the payment (to the sufferer) of such compensation as is necessary to cure him."

(*iii*) Abortion and Infanticide

Abortion—When any person caused abortion to a female slave by medicines, he was punished with the first amercement. (Book. III. Ch. 20).

"When any person causes abortion in pregnancy by striking or with medicines or by annoyance, the highest, the middlemost and the first amercements shall be imposed respectively".

Infanticide —A Woman murdering her offspring was to be torn-off by bulls, no matter whether she was big with a child or had not passed a month, after giving birth to a child. (Book. IV. Ch. 11).

(*iv*) Examination of Sudden Death

In all cases of sudden death the corpse was smeared over with oil and examined. In addition to the examination, a number of enquiries had to be made. Any clue afforded had to be followed up by further enquiries.

After examining the personal property such as travelling requisites, dress, jewels, or other things which the deceased had on his body when murdered, such persons

as supplied or had something to do with those things were examined as to the associates, residence, causes of journey, profession and other details of the deceased.

The following details are given to enable the reader to judge for himself the advanced state of forensic medicine in that age:—

"Any person whose corpse is stained with mucus and urine, whose organs are inflated with wind, with legs swollen, eyes open, and neck marked with ligatures, may be regarded as having been killed by suffocation and suppression of breathing.

Any person with contracted arms and thies may be regarded as having been killed by hanging.

Any dead person with swollen hands, legs and belly, sunken eyes, and inflated navel, may be regarded as having been killed by hanging.

Any dead person with stiffened rectum and eyes, tongue bitten between the teeth and belly swollen, may be considered as having been killed by drowning.

Any dead person stained with blood, and with limbs wounded or broken, may be regarded as having been killed with sticks or ropes.

Any dead person with fractures and broken limbs, may be regarded as having been thrown down.

Any dead person with dark coloured hands, legs, teeth and nails, loose skin, fallen hairs, reduced flesh, and face bedaubed with foam and saliva, may be regarded as having been poisoned.

Any dead person of similar description with marks of a bleeding bite, may be considered as having been bitten by serpents and other poisonous creatures.

Any dead person, with body spread and dress thrown out, after excessive vomiting and purging, may be considered as having been killed by the administration of the juice of the madana plant,

Death due to any one of the above causes is, sometimes, under the fear of punishment made to appear as having been brought about by voluntary hanging, by causing marks of ligature round the neck.

In death due to poison, the undigested portion of food may be examined in milk. Or the same extracted from the belly and thrown on fire may, if it makes a 'chittchita' sound and assumes a rainbow colour be declared as poisoned.

Or when the belly (*udaram or hridayam*) remains unburnt,(although the rest of the body is reduced to ashes) the dead man's servants may be examined as to any violent and cruel treatment they may have received at the hands of the dead. Similarly, some of the deadman's relatives like a person leading a miserable life, a woman with affections placed elsewhere or a relative defending some woman that has been deprived of her inheritance by the dead man, may also be examined.

The same kind of examination shall be conducted concerning the body of a deadman whose death is due to hanging.

Causes such as past evils or harm done to them by a dead man shall be inquired into regarding any death due to voluntary hanging ". (Bk. IV Ch. VII)

(*v*) JURIDICAL SURGERY

Various types of punishments are prescribed according to the nature of the hurt, the class of the parties involved and the motive behind the violence. (Bk. IV. Ch. 2.)

1. When a person wounded in a fight dies within 7 nights, he who caused the wound shall be put to instantaneous death; if the wounded man dies within a fortnight, the offender shall be punished with the highest amercement. If the wounded man dies within a month, the offender will be compelled to pay not only a fine of 500 panas but also an adequate compensation to the bereaved.

2. When a man hurts another with a weapon, he shall pay the highest amercement; when he does so under

intoxication, his hand shall be cut off. When he causes instantaneous death, he shall be put to death.

3. If any person insults his father, mother, son, brother, teacher or ascetic, his tongue shall be cut off; if he bites any of the limbs of these persons, he shall be deprived of the corresponding limb; if he murders any of them, he shall be put to death by having both his head and skin burnt.

4. A woman who murders a man was to be drowned. Any woman who murders her husband, or her preceptors or cuts off the bodily joints of another woman, shall be torn up by bulls.

5. He who hurts the tongue or nose of another, shall have his fingers cut off.

6. He who castrates a man, shall have his generative organs cut off.

7. When a person destroys both the eyes of another, he shall have his eyes destroyed by the application of poisonous ointment or pay a fine of 800 panas.

8. Any person who murders his father, mother, brother or teacher shall be put to death by burning both head and skin.

9. When a man wantonly murders another, he shall be be-headed.

10. If a man or woman under the infatuation of love, anger or other sinful passions commits or causes to commit suicide by means of ropes, arms or poison, he or she shall be dragged by means of a rope along the public road by the hand of a Chandala.

CHAPTER IX

(i) Medico-Legal Aspects of Marital and Sexual Offences

Marriage and remarriage : —The aim and object of marriage, was stated thus :

"Marriage precedes other calls of life. The joint duty of man and woman is "*prajapathya*"—Propagation of Race. Intercourse with wedded wife after monthly ablution was deemed a duty. "If many or all the wives are at the same time in menses, he shall live with that woman, among them, whom he married earlier or who has a living son. Of women who have sons, or are pious or bring forth only a dead child, or are beyond the age of menstruation, none shall be associated with, against her liking. If a man has no inclination, he may not lie with his wife who is either afflicted with leprosy or is a lunatic. But, if a woman is desirous of having sons she may lie with men suffering from such diseases." (Bk. III. Ch. 2).

Remarriage of Males :

Remarriage of males was allowed, if the woman was barren ; if the woman had for 8 years brought forth no live children or no males ; and if she brought forth only female children, for a period of 12 years.

The only condition to be satisfied was the fulfilment of financial obligations. The man had to provide compensation and subsistence. If he did this, he could marry any number of women, for women were created for the sake of children." (Bk. III., Ch. 2).

Remarriage of females :

The following rules were laid down for remarriage of women:

"Wives who belong to the Sudra, Vaisya, Kshatriya or Brahman caste, and who have not given birth to children, should wait as long as a year for their husbands

who have gone abroad for a short time ; but if they are such as have given birth to children they should wait for their absent husbands for more than a year. If they are not so provided with, their well-to-do '*gnatis*' should maintain them either for four or eight years. Then the 'gnatis' should leave them free to marry after taking what had been presented to them on the occasion of their marriages ".................." A young wife (kumari) who is wedded in accordance with the customs of the first four kinds of marriage (dharmavivaha) and whose husband has gone abroad and is heard of, shall wait for him for the period of seven menses (saptatirtha-thanyakanksheta) provided she has not publicly announced his name ; but she shall wait a year in case of her having announced (the name of her absent husband.) In the case of a husband who has gone abroad but who is not heard of, provided she has not publicly announced his name his wife shall wait for the period of five menses ; but in the case she has announced his name his wife shall wait for him for the period of ten menses .".......
..........................." In the case of husbands who have long gone abroad (dirghapravasinah), who have become ascetics, or who are dead, their wives, having no issue, shall wait for them for the period of seven menses ; but if they have given birth to children, they shall wait for a year. Then each of these women may marry the brother of her husband. If there are a number of brothers for the lost husband, she shall marry the one who is next in age to her former husband, or who is virtuous and capable of protecting her, or who is the youngest and unmarried. If there are no brothers for her husband, she may marry one who belongs to the same gotra as her husband's or a relative." (Bk. III., Ch. 4).

Divorce.—A woman may abandon her husband if he is of a bad character, or is likely to endanger the life of the wife, or has fallen from his caste or has lost virility. (Bk. III., Ch. 2).

(*ii*) Sexual Crimes

Rape.—In the section dealing with the safe guarding and protection of slaves and labourers, sound rules are laid down, aiming at the discouragement of rape.

" When a master has relationship with a nurse or pledged female slave, against her will, he shall be punished with first amercement ; a stranger doing the same shall be punished with the middlemost amercement. When a man commits or helps another to commit rape with a girl or female slave pledged to him, he shall not only forfeit the purchase value but also pay a certain amount of money (sulka) to her and a fine of twice the amount (of sulka) to the Government. Violation of the chastity of nurses, female cooks, or female servants of the class of joint cultivators or of any other description, shall at once earn their liberty for them. "

" When a watchman has carnal connection with a slave woman, he shall be punished. "

"When a person commits rape with a captive slave or hired woman in lock up, he shall be punished."

" When an officer commits rape with an Arya woman who has been arrested for untimely movement at night (akshanagirhitayam) he shall be hanged on the very spot ; when a similar offence is committed with a woman under slavery, the offender shall be punished with the first amercement. " (Bk. IV., Ch. 9).

Miscellaneous types of Sexual offences :

" When any person abducts a female slave he shall have both his legs cut off. When any person abducts an adulterer he as well as the woman who voluntarily yields herself for adultery shall have their ears and nose cut off (or pay each a fine of 500 panas), while the adulterer shall pay double the fine. "

He who defiles a maiden of equal caste before she has reached her maturity shall have his hand cut off or pay a fine of 400 panas ; if the maiden dies in consequence, the offender shall be put to death. "

" He who defiles a maiden who has attained maturity shall have his middle finger cut off or pay a fine of 200 panas, besides giving an adequate compensation to her father . "

" No man shall have sexual intercourse with any woman against her will. "

" He who defiles a willing maiden shall pay a fine of 54 panas while the maiden herself shall pay a fine of half the amount. "

" When a man impersonates another man who has already paid the nuptial fee to a woman (parasulkopadhayam) he shall have his hand cut off or pay a fine of 400 panas, besides making good the nuptial fee. "

" No man who has sexual connection with a maiden that has passed seven menses and has not yet succeeded in marrying her, though she has been betrothed to him, shall either be guilty or pay any compensation to her father ; for her father has lost his authority over her in consequence of having deprived her so long of the result of her menses. "

" It is no offence for a man of equal caste and rank to have sexual connection with a maiden who has remained unmarried for three years after her first menses. Nor is it an offence for a man, even of different caste, to have connection with a maiden who has spent more than three years after her first menses and has no jewellery on her person. "

" When a woman, being desirous of intercourse, yields herself to a man of the same caste and rank, she shall be fined 12 panas while any other woman who is an abettor in the case shall be fined twice as much. Any woman who abets a man in having intrercourse with a maiden against her will shall not only pay a fine of 100 panas, but also please the maiden by providing her with an adequate nuptial fee. "

" A woman who, of her own accord, yields herself to a man shall be a slave to the king .."

" For committing intercourse with a woman outside a village or for spreading false report regarding such things, double the usual fines shall be imposed. "

" Adultery may be proved by circumstances such as a hand-to-hand fight, adbuction, any marks made on the body of the culprits, opinion of experts on consideration of the circumstances, of the statements of women involved in it. " (Bk. IV., Ch. 12).

Unnatural offences :

" When a man has connection with a woman against the order of nature (anyoan) he shall be punished with the first amercement. A man having sexual intercourse with another man, shall also pay the first amercement. When a senseless man has sexual intercourse with beasts he shall be fined 12 panas ; when he commits the same with idols of goddesses (daivatapratima) he shall be fined twice as much. " (Bk. V. Ch. 13).

CHAPTER X

(i) Poisoning (Toxicology)

Kautilya mentions how kings were poisoned by queens. Internal poisoning was effected by mixing fried rice or honey with the poison. More ingenious was the mode of external poisoning,by having the anklet or the gem of the girdle-belt bedaubed with poison, or the looking-glass painted with poison. (Bk. I. Ch. 20).

Poisoning of individuals, as well as poisoning on a mass scale, was frequent. The art and science of poisoning was extensively studied as a separate branch and used both as an offensive and defensive measure against the enemy. Elaborate precautions were taken to safeguard the king against various types of poisoning.

Poisoning of water supplies was also known and punished. Poisons were also employed in warfare.

The steps taken to detect and banish wicked persons living by foul means may be indicated. Whoever was suspected of administering poison (rasa) to others, by reason of his talking of it, or his selling or purchasing mercury or his using it in preparing medicines, might be approached with a tale that a certain enemy or the spy might be killed and that a certain amount of money might be received as a reward. "If he does so, he shall be proclaimed as a poisoner (*rasada*) and banished ".....
Similar methods were employed against those who dealt with medicines prepared from the madana plant. (Bk. I4. Ch., 2).

But, in the interests of the state, to get rid of seditious persons certain acts were allowed. "A mendicant-woman, having captivated the wife of a seditious minister by using such medicines as excite the feelings of love, may, through that wife, contrive to poison the minister. '

"A 'sauce-maker' or a 'sweetmeat-maker may request of a seditious minister some sauce and sweetmeat by flattering him saying—" thou alone art worthy of such things." "Having mixed those two things and

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half a cup of water with poison, he may substitute those things in the luncheon (of the king) outside the city. Having made this event known to the public, the king may put them (the minister and the cook) to death under the plea that they are poisoners".

"If a seditious minister is given to witchcraft, a spy, under the guise of an accomplished wizard, may make him believe that by manifesting (in witchcraft) any one of *the such things*, as a pot containing an alligator, or a tortoise, or a crab he can attain his desired end. While with this belief, he is engaged in the act of witchcraft, a spy may murder him either by poisoning him or by striking him down with an iron bar, and declare that he has brought about his own death by this proclivity to witchcraft. A spy under the guise of a physician may make a seditious minister believe that he is suffering from a fatal or incurable disease and contrive to poison him while prescribing medicine and diet to him.

Spies under the guise of sauce-makers, and sweet-meat-makers may, when opportunity occurs, contrive to poison him."

"Spies may induce seditious persons in forts or in rural parts to be each other's guests at a dinner in which poisoners may administer poison: and for this offence, others may be punished." (Book 4., Ch. 1).

Poisoners (Rasadas): Among those who practised poisoning as a profession or a craft were the spies. There were many types of such poisoners among spies. Other persons who were selected for training as poisoners were those who had certain peculiarities or defects of character; Such those as who had no trace of filial affection, those who were cruel and indulgent by natures; the deaf, the dumb, the blind and the idiot, and those who had physical deformities, such as a hump-backed person, a dwarf, or a pigmy. Persons in certan employments and positions had special opportunities of administering poisons, and among these are mentioned the sauce-maker, the cook, the procurer of water for bathing, the shampooer, the spreader of the bed, the barber, the toilet maker and the water-servant. (Book I, Ch. 12).

Kautilya gives an interesting description of a person who has administered poison. " The suspicious marks are parched and dry mouth, hesitation in speaking, heavy perspiration, frequent yawning, bodily tremor, frequent tumbling, evasion of speech, carelessness in work, and unwillingness to keep to the place assigned to him."

Detection of poisoning:—One should infer from and indicate the presence of poison in the dish :—" When the flame and the smoke turn blue and crackle, and when birds (that eat the oblation) die ; When the vapour arising from cooked rice possesses the colour of the neck of a peacock, and appears chilled as if suddenly cooled ; when vegetables possess an unnatural colour, and are watery and hardened, and appear to have suddenly turned dry, being possessed of broken layers of blackish foam, and, being devoid of smell, feel and taste, natural to them; when utensils reflect light either more or less than usual, and are covered with a layer of foam at their edges ; when any liquid preparation possesses streaks on its surface ; when milk bears a bluish streak in the centre of its surface ; when liquor and water possess reddish streaks ; and when curd is marked with dark streaks, and honey with white streaks ; when watery things appear parched, as if overcooked , and look blue and swollen, ; when dry things have shrinked and changed in their colour ; when hard things appear soft, and soft things hard, when minute animalicules die in the vicinity of the dishes, when carpets and curtains possess blackish circular spots, with their threads and hair fallen off ; and when metallic vessels set with gems appear tarnished as though by roasting, and have lost their polish, colour, shine and softness of touch. (Book I, Ch. 20).

CHAPTER XI

(i) Health and Medical aid in Military Camps and Campaigns

Forts, Buildings and emergency stores.—In constructing forts, great attention was paid to sources of water supplies, fortifications being constructed on the banks of rivers or near deep pools of perennial water or in the vicinity of lakes and tanks. In describing the buildings and equipment of the fort, storing of emergency stocks seems to be indicated. It is also interesting to note the emphasis on collection of stores including Medicinal substances.

"Oils, grains, sugar, salt, *Medical Articles*, dry or fresh vegetables, meadow grass, dried flesh, hay stock, firewood, metals, skin, charcoal, tendons, poisons, horns, bamboo, fibrous garments, strong timber, weapons and armour shall be stored in the fort in such quantities as can be enjoyed for years together, without feeling any want. Of such collections, old things shall be replaced by new ones, when received". (Bk. II, Ch. 4)

Army on the march (*or during an invasion*).—In the course of advice to a king or army undertaking invasion of a country, the treatise lays down the following :—

"Such Providential visitations as fire, floods, *disease, pestilence, Pramara fever* (*Vidrava*), famine, and demoniac troubles are dangerous. Success in averting these is to be sought by worshipping Gods and Brahmins." Countries or regions frequently harassed by *epidemics* were not to be invaded. (Bk. IX, Ch. 7).

An officer with his retinue and labourers marched in front of an army on the march and dug wells for water. (Bk. X, Ch. 1).

Even regarding the march of the army careful planning was done as can be seen from the following extracts :

"Having prepared a list of villages and forests, situated on the road, with reference to their capacity to supply

grass, firewood and water, the march of the army should be regulated according to the programme of short and long halts. Foodstuffs and provisions should be carried in double the quantity that may be required in any emergency. In the absence of separate means to carry foodstuffs, the army itself should be entrusted with the business of carrying them or they may be stored in a central place". In another passage, it is said that the king should protect his army when it has to cross a long desert without water; when it is without grass, firewood and water, when it has to traverse a difficult road; when it is suffering from hunger and thirst, after a journey; when it is ascending or descending a mountainous country full of mire, pools, rivers and cataracts..........; when it is tired from a long march; when it is sleepy, when it is suffering from *disease, pestilence* or famine; when a great portion of the infantry, cavalry and elephants is *diseased.*" (Bk. X, Ch 2).

Describing the operation of siege, the conquerer was advised to attack when the enemy was suffering from *disease,* famine, or loss of stores. The besieged was sometimes made to believe that the invader was abandoning the siege with the intention of escaping from a *disease* and when the besieged came out, they were hemmed in and killed. (Bk. XIII, Ch. 4).

Troubles of the Army.– Discussing the troubles of an army the treatise adds that the army might be tired and might have to be refreshed by being allowed to bathe, eat and sleep. The army might also be suffering from the inclemency of the weather and might have to be protected by *appropriate dress* suited to the season. The Army might also be *diseased and unfit* for work. (Bk: VII, Ch. 5).

Restoration of peace and happiness to a conquered country.—Indicating the healthy reform needed to restore peace to a conquered country, Kautilya says "The King should release all prisoners and afford ***help to the miserable, helpless and diseased persons.*** He should also prohibit the slaughter of females and of young ones, as well as castration." (Bk. XIII, Ch. 5).

Physicians, Nurses and Ambulance.—Kautilya mentions, apart from the Royal physicians and the medical

practitioners, a separate category known as "*physicians of the army*" who were paid 2000 *panas* per annum. Rules of Medical practice probably applied to them also.

(*Medical Practice*).—"Physicians undertaking medical treatment without intimating (to the Government) the dangerous nature of the disease shall, if the patient dies, be punished with the first amercement. If the death of a patient under treatment is due to carelessness in the treatment, the physician shall be punished with the middle-most amercement. Growth of disease due to negligence or indifference (karmavadha) of a physician shall be regarded as assault or violence." (Bk. IV Ch. 1). The king was advised to look to the bodily comforts of his servants, by providing such emoluments as could infuse in them, the spirit of enthusiasm to work. The chariot-driver, the trainer of horses, and the carpenter were also given the same pay as the *army doctors*. The sons and wives of those who died while on duty got a subsistence and wages. Infants and aged persons related to the deceased servants were to be shown favour. On occasions of funerals, *sickness* or *childbirth*, the king was to give presentations to those of his servants concerned therein. When wanting in money, the king might give forest produce, cattle, or fields, along with a small amount of money. (Bk. V, Ch. 3).

In describing the order of the march, and array of the army, preparatory to a battle, Kautilya writes "physicians with *surgical instruments* (*sastra*), *machines*, *remedial oils*, and *cloth in their hands*, and women (*nurses*) with prepared food and beverages, should stand behind, uttering encouraging words to fighting men". (Bk. X, Ch. 3)

One of the duties of the free labourers was "*carrying the men that were knocked down* along with their weapons and armour." (Bk X. Ch. 4). This was probably, a primitive form of field ambulance service.

Fighting men and their armour and weapons.— This is made clear from the following statement :

"Likewise, *Sirastrana* (cover for the head), *Kanthatrana* (cover for the neck), *Kurpasa* (cover for the trunk),

kancuka (coat extending as far as the knee-joints), *Varavana* (coat extending as far as the heels), *patta* (Coat without cover for arms), *Nagodarika* (gloves), are the varieties of armour"?..........*Veti, charma, hastikarna, talamula kavata katika, aspratihate* and *valshakanta*, are instruments used in self-defence." (Bk.II, Ch.18)

Air Raids, and Incendiary Attacks.– In describing the operation of a siege, the book mentions two very interesting procedures, which appear to be early and crude forms of the incendiary bomb and of aerial attacks.

"Having captured the birds such as the vulture, crow, parrot, mina and pigeon, which have their nests in the fort walls, and having tied to their tails inflammable powders (agniyoga) he may let them fly to the forts Spies living as watchmen of the fort may tie inflammable powder to the tails of mongooses, monkeys, cats and dogs, and let them go over the thatched roofs of houses a splinter of fire kept in the body of dried fish may be caused to be carried off by a monkey, or a crow or any other bird to the thatched roofs of the houses !"

As regards incendiary powders etc., many examples are given out of which one may be cited. "Small balls prepared from the mixture of *sarala* (Pinue longigolia) *devadaru* (deodar), *patitina* (Strinking grass), *Guggulu* (Bdellium), *drivengtaka* (Turpentine,) the juice of *araja* (vatica Robusia), and *Laksha* (Lac), combined with the dung of an ass, camel, sheep or goat are inflammable. (Bk. XIII, Ch. 4).

CHAPTER XII

(i) CHEMICAL WARFARE

Powders causing instantaneous death by their smoke.—Book XIV deals with secret means and in this book, the first Chapter teaches how to injure an enemy.

The powder (prepared from the carcass) of animals such as chitra (?), bheka (frog), Kaundinyaka (?), krikana (perdix sylvatika), panchakushtha (?) and Satapadi (Centipede); or of animals such as uchchitinga (crab), kambali (?); krikalasa (lizard), with the powder of the bark of satakanda (phyalis Flexuosa); or of animals such as grihagaulika (small house-lizard), andhahika (a blind snake), krakanthaka (a kind of partridge), putikita (a stinking insect) and gomarika (?), combined with the juice of bhallataka (Semecarpus Anachardium), and valgaka (?): the smoke caused by burning the above powders causes instantanous death. Any of the (above) insects may be heated with a black snake and priyangu (Panic seed) and reduced to powder. This mixture, when burnt, causes instantaneous death. The smoke caused by burning the powder made of the mixture of the dung and urine of pigeons, frogs, flesh-eating animals, elephants, men, and boars, the chaff and powder of barley mixed with kasisa (green sulphate of iron) rice, the seeds of cotton, kutaja (Nerium antidysentericum), and kosataki (luffa pentandra), cow's urine, the root of bhandi (hydrootyle asiatica), the powder of nimba (nimba meria), sigru (hyperanthera morunga), phanir jaka (a kind of tulasi plant), kshibapiluka (ripe coreya arborea), and bhanga (a common intoxicating drug), the skin of a snake and fish, and the powder of the nails and tusk of an elephant all mixed with the chaff of madana and kodrava (paspalam scrobiculatum), or with the chaff of the seeds of hastikarna (castor oil tree) and palasa (butea frondosa) causes instantanouces death wherever the smoke is carried off by the wind (Bk. XIV. Ch. 1).

2. *Causing death in the course of a month.* The powder prepared from the roots of dhamargava (luffa foetida) and yatudhana (?) mixed with the powder of the flower of bhallataka (Semecarpus Anacardin) causes, when

administered, death in the course of half, a month. The root of vyaghata (casia fistula) reduced to powder with the powder of bhallataka (Semecarpus Anacardium) mixed with the essence of an insect (kita) causes, when administered, death in the course of a month. The dose is a kala (16th of a tola) to men (Bk. XIV. Ch.1).

3. *Powder causing blindness.*—The smoke caused by burning the powder of putikita (a stinking insect), fish, katutumbi (a kind of bitter gourd) the bark of satakardama (?), and indragopa (the insect cochineal), or the powder of putikita, kshudrarala (the resin of the plant, shorea robusta), and hemavidari (?) mixed with the powder of the hoof and horn of a goat, causes blindness. The smoke caused by burning the leaves of putikaranja-(guilandina bonducella), yellow arsenic, realgar, the seeds of gunja (abrus precatorious), khacha (salt?), and the dung and urine of a cow causes blindness. The smoke caused by burning the skin of a snake, the dung of the cow and the horse, and the head of a blind snake causes blindness. The ointment prepared by mixing the excretion of sarika (maina), kapota (pigeon), baka (crane)-and balaka (a kind of small crane), with the milk of mankakshi (hyperanthera morunga), piluka (a species of careya arborea) and snuhi (euphorbia), causes blindness and poisons water.

4. *Powders causing madness.*—The smoke caused by burning the mixture of the powders of krikana (a kind of partridge), krikalasa (lizard) grahagaulika (a small house-lizard), and andhahika (a blindsnake), destroys the eyes and causes madness (Bk. XIV. Ch. 1).

5. *Substances causing leprosy, consumption, cholera, fever etc.*—The (smoke caused by burning the) mixture of krikalasa and gruhagaulika causes leprosy. The smoke caused by burning the same mixture together with the entrails of chitrabheka (a kind of frog of veriegated colour), and madhu (celtis orientalis?), causes gonorrhoea. The same mixture mixed with human blood causes consumption. The Powder of dushivisha (?), madana (dattura plant), and kodrava (paspalam scrobiculatum), destroys the tongue. The mixture of the powder of matravahaka (?), jaluka (leech), the tail of a peacock, the eyes of a frog, and piluka (careya arborea), causes the disease known as vishuchika. The mixture of panchakushtha

(?), kaudinyaka (?), rajavrksha (cassia fistula), and madhupushpa (bassia latifolia), and madhu (honey ?) causes fever (Bk. XIV. Ch1).

6. *Substances causing dumbness and deafness.*—The mixture prepared from the powder of the knot of the tongue of bhaja (?), and nakula (mangoose), reduced to a paste with the milk of a she-donkey, causes both dumbness and deafness (Bk. XIV. Ch. 1).

7. *Substance to produce biting madness.*—Whoever is pierced by the arrow prepared from the grains of salmali (bombax heptaphyllum) and vidari (liquorice) reduced to powder and mixed with the powder of mulavatsanabha (a kind of poison) and smeared over with the blood of chuchundari (musk rat) bites some ten other persons, who in their turn bite others. The mixure prepared from the flowers of bhallataka (semecarpus anacardium), yatudhana (?), dhamargava (achyranthes aspera), and bana (sal Tree), mixed with the powder of ela (large cardamom), kakshi (red aluminuous earth), guggulu (bdellium), and halahala (a kind of poison), together with the blood of a goat and a man, causes biting madness (Bk. XIV. Ch. 1).

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CHAPTER XIII

(i) Remedies Against Injuries

Book XIV Chapter IV mentions remedies the injuries of one's own army and the whole chapter against makes very interesting reading.

Remedies against poisons and poisonous compounds applied by an enemy against one's own army or people are descriled in detail.

When the things that are meant for the king's use, inclusive of the limbs of women, as well as the things of the army, are washed in the tepid water prepared from the decoction of sleshmatakia (sebesten or cordia myk), kapi (emblica officinalis), modanta (ivory), satha (citron tree), gojigi (gojihva) ?-(elephantophus scaber), visha (aconitum ferox), patali (bignonia suave olens), bala (lida cardifolia et rombifolia), syonaga (bignonia indica), punarnava (?), sveta (andropogon aciculatum), and tagara (tabernoe-montana coronaria), mixed chandana (sandal) and the blood of salavriki (jackal), it removes the bad effects of poison.

The mixture prepared from the biles of prshata (red spotted deer), nakula (mungoose), nilakantha (peacock), and godha (alligator), with charcoal powder (mashiraji), combined with the sprouts (agra) of sinduvara (vitex triholia), tagara (tabernoe-montana coronaria), varuna (teriandium indicum), tanduliyaka (amaranthus poygamus), and sataparva (convolvulus repens), together with pinditaka (Vanqueria spinosa), removes the effects of mixture of madana.

Among the decoctions of the roots of srgala (bignonia indica), vinna (?), m dana, sinduvara (viex trifolia) tagara (tabernoe-montana coronaria), and valli (a creeper) any one or all mixed with milk, remove when drunk, the effects of the mixture of madana.

The stinking oil extracted from kaidarya (vangueria spinosa) removes madness.

The mixture prepared from priyangu (panic seed) and naktamala (galedupa arborea) removes, when applied through the nose, leprosy.

The mixture prepared from kushtha (costus) and lodhra (symplocus) removes consumption.

The mixture prepared from katuphala (glelina arborea), dravanti (anthericum tuberosum), and villanga (a kind of seed,) removes, when applied through the nose, headache and other diseases of the head.

The application of the mixture prepared from priyangu (panic seed), manjishtha (rubia manjit), tagara (tabernoemontana coronaria), laksharasa (the juice or essence of lac), madhuka, (?), haridra (turmeric) and kshaudra (honey), to persons who have fallen senseless by being beaten by a rope, by falling into water, or by eating poison, or by being whipped, or by falling, resuscitates them.

Dose :—The proportion of a dose is as much as an aksha(?) to men ; twice as much to cows and horses ; and four times as much to elephants and camels.

A round ball (mani) prepared from the above mixture and containing gold (rukma) in its centre, removes the effects due to any kind of poison.

A round ball (mani) prepared from the wood of asvattha (holy fig tree) growing wound round with the plants such as jivanti (a medicinal plant) sveta (andropogan aciculatum), the flower of mushkaka (a species of tree), and vandaka (epidendrum tesseloides), removes the effects due to any kind of poison.

The sound of trumpets painted with the above mixture destroys poison ; whoever looks at a flag or banner besmeared with the above mixture will get rid of poison.

Having applied these remedies to secure the safety of himself and his army, a king should make use of poisonous smokes and other mixtures to vitiate water against his enemy.

CHAPTER XIV

(i) PRESCRIPTIONS FOR WONDERFUL OR STRANGE FEATS

Book XIV Chapter II treats of wonderful and delusive contrivances ;

1. *It gives a powder to enable a man to fast for a month.*—A dose of the powder of sirisha (mimosa sirisa), udumbara, (glomerous fig-tree), and sami (acacia suma), mixed with clarified butter, renders fasting possible for half a month ; the scum prepared from the mixture of the root of kaseruka (a kind of water-creeper), utpala (costus) ? and sugar-cane mixed with bisa (water-lilly), durva (grass), milk, and clarified butter, enables a man to fast for a month. The powder of masha (phraseolus radiatus), yava (barley), kuluttha (horse-gram), and the root of darbha (sacrificial grass), mixed with milk and clarified butter ; the milk of valli (a kind of creeper), and clarified butter derived from it, and mixed in equal proportions, and combined with the paste prepared from the root of sala (shorea robusta), and prsniparni (hedysarum lagopodioides), when drunk with milk ; or dose of milk mixed with clarified butter and spirituous liquor, both prepared from the above substances, enables one to fast for a month.

2. *It gives prescription to produce change of colour of skin and of hair.*—The oil prepared from mustard seeds previously kept for seven nights in the urine of a white goat will, when used externally, after keeping the oil inside a large bitter gourd for a month and a half, alters the colour of both biped and quadruped animals. The oil extracted from white mustard seeds mixed with the barley corn contained in the dung of a white donkey which has been living for more than seven nights on a, diet of butter, milk and barley, causes alteration in colour. The oil prepared from mustard seeds which have been previously kept in the urine and fluid dung of any of the two animals, a white goat and a white donkey, causes (when applied) such white colour as that of the fibre of arka plant or down of a (white) bird the mixture of the dung of a white cock and ajagara (boa-constictor) causes white colour. The paste made from

white mustard seeds kept for seven nights in the urine of white goat mixed with butter-milk, the milk of arka plant, salt and grains (dhanya). causes, when applied for a fortnight, white colour. Whoever eats the mixture of the powders of the roots of kukkuta (marsilia denata), kosataki (duffa pentandra), and satavari (asperagus racemosus) for a month will become white. Whoever bathes in the decoction of vata (banian tree) and rubs his body with the paste prepared from a sahachera (yellow barleria) becomes black. Sulphuret of arsenic and red arsenic mixed with the oil extracted from sakuna (a kind of bird) and kanka (a vulture) causes blackness. The paste, prepared from white mustard seeds which have been previously kept within a large bitter gourd and with clarified butter prepared from the milk of valli (a creeper) for half a month makes the hair white. A bitter gourd, a stinking insect (putikita), and a white house-lizard ; when a paste prepared from these is applied to the hair, the latter becomes as white as a conch shell.

3. *Agents which bring on leprosy.*—When any part of the body of a man is rubbed over with the paste (kalka) prepared from tinduka (glutinosa) and arishta (soap-berry), together with the dung of a cow the part of the body being also smeared over with the juice of bhallataka (semecarpus anacardium), he will catch leprosy in the course of a month. (The application of the paste prepared from) gunja seeds, kept previously for seven nights in the mouth of a white cobra or in the mouth of a house-lizard, brings on leprosy. External application of the liquid essence of the egg of a parrot and a cuckoo brings on leprosy. The paste or decoction prepared from priyala (chironjia sapida or vitis vinifera?) is a remedy for leprosy. (Bk XIV Ch II)

4. *To walk over fire without hurt :*

Whoever has anointed his legs with the oil extracted from the paste prepared from the roots of paribhadraka (erythrina indica), pratibala (?), vajula (a kind of ratan or tree), vajra (andropogon muricatum or euphorbia), and kadali (banana), mixed with the serum of the flesh of a frog can walk over fire (without hurt). Oil should be extracted from the paste prepared from the roots of Pratibala, vajula and paribhadraka, all growing near

water, the paste being mixed with the serum of the flesh of a frog. Having anointed one's legs with this oil one can walk over a white-hot mass of fire as though on a bed of roses. (Bk. XIV Ch. II)

5. *To reduce fatigue on walking :*

The paste prepared from the powder of the rib bone of naraka (?), a donkey, kanka (a kind of vulture), and bhasa (a bird), mixed with the juice of water-lily is applied to the legs of bipeds and quadrupeds (while making a journey.) When a man makes a journey, wearing the shoes made of the skin of a camel, smeared over with the serum of the flesh of an owl and a vulture and covered over with the leaves of the banian tree, he can walk fifty yojanas without any fatigue. (When the shoes are smeared over with) the pith, marrow or sperm of the birds, hyena, kanka, kaka grdhra, hamsa, krauncha, and vichiralla (the traveller wearing them) can walk a hundred yojanas without any fatigue. The fat or serum derived from roasting a pregnant camel together with saptaparna (lechites scholaris), or from roasting dead children in cremation grounds, is applied to rendera journey of a hundred yojanas easy. (Bk XIV Ch 2)

Book XIV Chapter III is entitled " application of medicine and manthras " :

1. *Powder to see in pitch darkness at night :*

Having pulled out both the right and the left eye-balls of a cat, camel, wolf, boar, porcupine, vaguli (?), naptr (?), crow and owl, or of any one two, or three, or many of such animals as roam at nights, one should reduce them to two kinds of powder. Whoever anoints his own right eye with the powder of the left eye-ball and his left eye with the powder of the right eye-ball can clearly see things even in pitch dark at night. One is the eye of a boar : another is that of a khadyota (fires fly), or a crow, or a mina bird. Having anointed one's own eyes with the above, one can clearly see things at night.

2. *Methods to become invisible :*

Having fasted for three nights, one should, on the day of the star Pushya, catch hold of the skull of a man

who has been killed with a weapon or put to the gallows. Having filled the skull with soil and barley seeds, one should irrigate them with the milk of goats and sheep, putting on the garland formed of the sprouts of the above barely crop, one can walk invisible to others. Having fasted for three nights and having afterwards pulled out on the day of the star of Pushya both the right and the left eyes of a dog, a cat, an owl, and a vaguli (?), one should reduce them to two kinds of powder. Then having anointed one's own eyes with this ointment as usual one can walk invisible to others. Having fasted for three nights one should on the day of the star of Pushya, prepare a round-headed pin (salaka) from the branch of purusha-ghati (punnaga tree). Then having filled with ointment (anjana) the skull of any of the animals which roam at nights, and having inserted that skull in the organ of procreation of a dead woman, one should burn it. Having taken it out on the day of the star of Pushya and having anointed one's own eyes with that ointment, one can walk invisible to others. Wherever one may happen to see the corpse burnt or just being burnt of a Brahman who kept sacrificial fire (while alive), there one should fast for three nights; and having on the day of the star of Pushya formed a sack from the garment of the corpse of a man who is dead from natural causes, and having filled the sack with the ashes of the Brahman's corpse, one may put on the sack on one's back, and walk, invisible to others.

CHAPTER XV

(*i*) Veterinary Medicine

The existence of Veterinary Medicine in India, from the earliest historic times, is no more in doubt, on account of the discovery of the many valuable treatises in Sanskrit which deal with the care of cattle and cure of their diseases in a very systematic and scientific manner. There are also many allusions in non-professional, religio-historical works, like puranas, epics etc., to cattle diseases, as well as to the eminent experts and writers on Veterinary Medicine, from Sages to Princes. Kautilya's Arthasastra or Political Economy, also gives a general but interesting peep into the work of the Veterinary doctors under state control. The numerous references scattered throughout the book may be classified under certain headings..

(1) Care and treatment of elephants and horses for the use of the Royalty and the Army.

(2) Care and treatment of cattle for the benefit of agriculture and dairy products.

(*ii*) Elephants

Why were elephants cared for ? " The victory of Kings in battles depends mainly upon elephants, for elephants, being of large bodily frame, are capable of not only destroying the arrayed army of an enemy, his fortifications and encampments, but also of undertaking works that are dangerous to life. " Special elephant forests were preserved, and so important were elephants that a rule was passed stating " wheover kills the elephants shall be put to death ". They may be said to have served the same purpose as the modern tank.

There was a Superintendent of elephants, with many duties relating to the housing, feeding training and care of the animals, including supervision of the work of elephant doctors. Elephant doctors received rations (one prastha of rice, a handful of oil, 2 palas of sugar and salt) and they had to apply necessary remedies to elephants

which, while making a journey, happened to suffer from disease, over-work, rut or old age. Elephant doctors gave instructions to experts in catching elephants, to catch certain types of elephants, with auspicious characters. Diseased elephants were not to be captured. Waving of lights at certain times and sacrifices to *Bhutas* were done for the safety of the animals.

There are many interesting extracts relating to the daily life and rations of the elephants according to the size and class.

(*iii*) Horses

The regular training of a horse was its preparation for war, and training in different movements, forms of jumping and galloping. The cavalry corresponded to the modern army motor-cyclist or dive-bomber.

There was also a Superintendent of horses who kept a register of all classes of horses, according to their breed etc., and made a report on the crippled and diseased horses, housing of the horses, fixed or supplied rations for colts and horses of various sizes and qualities, etc.

On new moon days sacrifices were made to *Bhutas*, and on full moon days chanting of auspicious hymns was performed. At the time of the commencement and close of a journey and in times of disease, a priest waved lights invoking blessings on the horses. There were some special people who applied remedies against poison. If they failed to discharge their duties, they forfeited their daily wages.

"Veterinary surgeons shall apply requisite remedies against the undue growth or diminution in the body of horess and also change the diet of horses according to changes in season. When owing to defects in medicine or carelessness in the treatment, diseases (of the horse) become intense, a fine of twice the cost of the treatment shall be imposed. When, owing to the defects in medicine or failure in administering it, the result becomes quite the reverse, a fine equal to the value of the animal shall be imposed." Horses undergoing treatment were kept in comfortable stables and were not to be taken out for riding.

Care of the old horses.—Stallions which are incapacitated owing to old age, disease or hardships of war, and, being therefore rendered unfit for use in war, live only to consume food, shall, in the interests of citizens and country people, be allowed to cross steeds. "

There are also many interesting regulations prescribing rations and drinks for horses of different sizes. Rationing under special conditions and for horses of different ages was also fiexd.

(*iv*) CATTLE

There was a Superintendent of cows, with multifarious duties including classifications of cows, who kept a register of the classes of herds and supervised the work of cowherds etc. The superintendent saw to it that the cows were milked only according to rules (once or twice according to the season), checked the utilisation of the milk as well as the quantity of butter yielded by the milk of cows, buffaloes, goats , sheep etc., according to the fodder given. Rations were fixed for different types of bulls and cows. All cattle were to be supplied with abundance of fodder and water. Draught oxen and cows yielding milk were given subsistence in proportion to the duration of time the oxen were kept at work and the quantity of milk which the cows supplied.

The owners of cattle had to protect cows from drowning, lightning, tigers, cobras etc. Cowherds had to see that their cattle did not enter deep rivers or lakes or get caught by mire or crocodiles. Whenever an animal was caught hold of, by a thief, a tiger, a snake, or a crocodile, or when it was too infirm owing to age or disease, the cowherds had to make a report of it. Cowherds had to apply remedies to calves or to aged cows suffering from disease.

There were available Veterinary Surgeons and experts in cattle diseases to examine and advise. The passage quoted in the Section on horses, applied as much to the treatment of cows, buffaloes, goats and sheep as to horses One of the duties of the King was to protect cattle from cattle-diseases.

Cruelty to animals was punished. Whoever hurt or caused another to hurt a cow was to be slain. The state offered full facilities for cattle breeding by maintaining bulls for crossing cows, as distinct from draught oxen, *yoken* oxen and bulls for supply of flesh :

Animal nutrition was well understood as can be seen from the following extract :—" Increase in the supply of milk and butter depends on the nature of the soil and on the quality and quantity of water and fodder. " (Bk II,-ch 29)

Rations for cattle were provided on a generous scale:-

" For bulls, which are provided with nose strings, and which equal horses in speed and in carrying loads, the following rations were given" : Half a bhara of meadow grass (yavasa), twice the above quantity of ordinary grass (trina), one tula (100 palas) of oil cakes, 10 adhakas of bran, 5 palas of salt (mufiha lavanam), one " *hundumb* " of oil for rubbing over the *nose* (hasya) 1 prastha of drink (pana), one tola of flesh, 1 adhaka of curds, 1 drona of barley or of cooked masha (pharaseolous rediatus), 1 drona of milk or half an adhaka of sura (liquor), 1 prastha of oil or ghee (sneha), 10 palas of sugar or jaggery, 1 pala of the fruit of ' *sringibera* ' (Ginger) may be substituted for milk.

" The same commodities less by one quarter each will form the diet for mules, cows, and asses ; twice the quantity of the above things for buffaloes and camels. "

" For bullocks, one drona of masha (phraseolous radiatus) or one drona of barley, cooked with other things as prescribed for horses, is the requiste quantity of food besides the special and additional provision of one tula of oilcakes (ghanapinyaka) or ten adhakas of bran (kanakundaka).

" Twice the above quantity for buffaloes." (Bk II. Ch 29)

PART II

GLEANINGS FROM HISTORICAL WRITINGS AND EDICTS.

CHAPTER I

(i) THROUGH GREEK SPECTACLES.

Greek Contacts With India :—During the historic sojourn in India, Alexander and his retinue must have had ample opportunities to see and verify for themselves the healing art of Indian physicians and the glory of Taxilla, the greatest centre of medical instruction in the East for centuries before the birth of Hippocrates. It is recorded that when Alexander arrived on the banks of the Indus, Taxilla was a great flourishing City", the greatest of all which lay between Indus and Hydaspes". This statement from the Greek writers is yet another confirmation of the cultural and intellectual supremacy of Taxilla during that period, when even according to Hindu and Buddhist records, all students flocked to this centre to study at the feet of the great Masters of Medicine.

As early as the fifth century B.C. this city, the capital of a kingdom, was an important part of the Persian Empire. An inscription of Darius (521 B.C.—485 B.C.) at Persepolis makes mention of a new Indian Satrapy regarded as the richest and the most populous in the Empire and distinct from Gandhara. Sir John Marshall assumes that this region comprised the kingdom of Taxilla. One of the most interesting relics of Persian influence at Taxilla is an inscription in Aramic characters of the 4th or 5th century B.C., the only Aramic record that has yet been found in India. The late Mr. Jayaswal stated, as a result of his studies of various historical evidences, that a Greek colony existed in Afghanistan, even before the invasion of India by Alexander.

Alexander halted at Taxilla in the spring of 326 B.C. for some weeks. The city was then very wealthy, populous and well governed. The reigning king was Ambhi known to Greeks as "Taxilles". He offered his submission to Alexander, entertained him with lavish hospitality and provided a contingent of 5,000 men. The people of Taxilla and the Governor of the City received Alexander in a friendly manner. The cordial relations between the sons of the soil and the invaders may be judged by the

fact that Alexander held gymnastic contests and also left behind in the city those soldiers who were invalidated (*i.e.*, in a Base Hospital). In his march against Porus, the Macedonian took the 5,000 Indians commanded by "Taxilles".

Literary and historical researches have fairly established that many Greeks visited this country in the 4th and 3rd centuries B.C. McCrindle gives a list of the writers and their works. Alexander took scientific and literary men with him to chronicle his achievements. This expedition produced quite a crop of narratives and memoirs relating to India, such as those of Baeto, Diognetos, Nearchos, Onesikritos, Aristoboukos, Kallisthenes, and others. Eumenes of Kardia, Alexander's Secretary, kept the Court Journal (Ephemerides). Diodetus is also believed to have been partly responsible for the Court Journal. Megasthenes, who was an ambassador of Seleukos to the Court of Sandracottos (Chandragupta Mourya) between the year 302 and 288 B.C., and Diamachos, who resided for a long time at the Court of the son and successor of Chandragupta Maurya, wrote extensive treaties on India. Subsequent to these writers came some others, who made considerable additions to the stock of information regarding India, among whom may be mentioned Patrokles, the admiral of Seleukos, Timosthenes, admiral of the fleet of Ptolemaios Philadelphos, Erotosthenes, Hipparchos, Polemo, Museous, Appollodoros, Agatharchidas, Alexander Polyhistor, Strabo, Marimos of Tyre, and Ptolemy among the Greeks ; and P. Teretins Varro of Atax, M. Vipsanius Agrippa, Poun ponius, Mela, Seneca, Pliny and Solunius among the Romans. All these original notes and treatises are now lost. Fragments of the lost works and incomplete summaries are now available, in the brief consecutive narratives of Indian campaigns compiled from the above treatises, by subsequent historians and compendium writers, namely, Diodoras, Strabo, Pliny, Arrian, Curtius Refus, Justinus Frontinus and Plutarch.

In pursuing these fragmentary extracts and in forming impressions or drawing conclusions, one has always to bear in mind that we are not reading the original descriptions in the complete works but only some of the epitomes and a few particular fragments that have survived the wreck of time. Most of the Greeks were either sojourners

or visitors and could not have had thorough acquaintance with the indigenous art and sciences, kept as closely guarded secrets by intellectual groups or certain families. Even when the Greeks had better knowledge of the language and the country, their vision would be limited to the cities and the royal courts. The real India, the rural India, and the ordinary classes, with their beliefs and their common practices etc., could not easily come to their notice. Megasthenes himself stated that Indians were ignorant of writing and must trust to memory. When one remembers that even today it is the custom and the temptation for the literary hack and compendium-writer to select and piece together only the most thrilling stories or wonderful tales, leaving out the major part, dealing with the people, society and beliefs and practices of the region and the particular age, it is easy to understnd how fragmentary and necessarily incomplete will be the picture of Indian Medicine, that we get from the extracts, fragments and summaries.

(ii) Megasthanes on Indian Medicine and Allied Subjects

Food.—He mentions that India supplied food in unsparing profusion and that its soil produced fruits of all kinds. In addition to cereals, millet and rice, pulses of different sorts were grown throughout India. He mentions other plants useful for food, such as bosporum. Famine had never visited India. Food scarcity was never known. Fruits and succulent roots afforded abundant sustenance. He also mentions garden vegetables. At supper a small tripod was placed nearby with a bowl on it. Into this they put boiled rice and added many dainties prepared according to Indian recipes.

Drinks.—Indians never drank wine except at Sacrifices. This beverage was a liquor prepared from rice instead of from barley and their food was principally rice pottage. They always ate alone and had no fixed hours when meals were to be taken by all in common.

Profession.— The custom of the country prohibited any from exercising two trades. One cannot become a husbandman if he is a herdsman or an artisan. (It

may be presumed that this rule applied to the medical profession also).

Physicians:— Next in honour to the Hylobioi were the physicians, since they were engaged in the study of the nature of man. They were simple in their habits, but did not live in the fields. Their food consisted of rice and barley meal which they could always get for the mere asking or receive from those who entertained them as guests in their houses. They effected cures rather by regulating diet than by the use of medicine. The remedies most esteemed were ointments and plasters. All others were considered to be in a general measure pernicious in their nature.

Knowledge of nature.—Megasthenes mentions that Hindus had, in addition to the four elements, the 5th one "Akash", He also says that all that has been said regarding nature by the ancients is asserted also by philosophers out of Greece, namely the Brahmins in India and the Jews.

Knowledge of pharmacy.—By their knowledge of pharmacy, they could make marriages fruitful and even determine the sex of the offspring.

Public health department.—Those who had charge of the Cities were divided into 6 bodies of 5 each. The second group attended to the entertainment of foreigners and assigned lodgings to them. They also took care of the foreigners when they were sick, and sent physicians to attend on them. If any foreigner died, the Committee arranged for the burial and delivered over such property as he left to his relatives. The third Committee enquired as to when and how births and deaths occurred among both high and low.

The philosophers as guardians of public health.—The first caste known as philosophers forewarned the multitudes about drought and wet weather and also about epidemic diseases at the beginning of each year. These philosophers abstained from animal food and spent their time in learning and imparting knowledge. Later, after they married, they ate flesh but abstained from hot and highly seasoned food.

Anthropological observations.—He refers to men who wanted a nose having only two orifices above the mouth through which they breathed. He also describes pygmies, 5 or even 3 spans in height. Some had no mouths and subsisted on the flavour of roasted flesh or on the perfumes of fruits and flowers. They distrusted things of evil smell and it was with difficulty that they could keep their hold on life. There was another tribe without nostrils who devoured everything, ate raw meat and were short lived and died before old age.

Insects and poisonous vermin.—Megasthenes says that there were winged scorpions of enormous size which stung Europeans and natives alike. There were also winged serpents. They went abroad during the night. When their urine fell upon any one's skin, it raised putrid sores at once.

(*iii*) EXTRACTS FROM ARRIAN

Forecasting of Epidemics.—Arrian reproduces the following passage from Onesikritas' "They (Gymnosophists) employ themselves much on natural subjects as forecasting the future, rain, drought and disease". The same class regarded "disease of the body as very disgraceful and he who fears that it will attack him prepares a pyre and lets the flames consume him". It looks as if Euthanasia was the fashion of the day, at least among the intellectuals.

Ante-natal care.—From the time of conception, pregnant women were placed under the care of old and learned men who, under the pretence of using some incantations for the welfare of herself and her unborn babe, in reality, gave her prudent hints and counsels. The women who listened most willingly were thought to be the most fortunate in their children.

Indians alone could cure snake-bite cases.—Arrian mentions (quoting Megasthenes and Nearchos) the high achievements of Indian Physicians. "But no cure of the bite of the Indian snake has been found out by any of the Greek Physicians, though the Indians can cure those who are bitten; and Nearchos adds this that Alexander had all the most skilful of the Indians in the heeling art collected around him and had caused proclamation to

be made throughout camp that if anyone was bitten he should repair to the Royal tent".

Diseases and treatment.—These very same men were able to cure other diseases and pains also. With many bodily pains, however, the Indians were not afflicted because in their country the seasons were genial. In the case of an attack of severe pain they consulted the Sophists and these seemed to cure, whatever diseases could not be cured without their help, by the use of charms.

(*iv*) Fragments from Curtius Rufus

Indian kings sent aphrodisiacs as presents.—According to Athenaios, among the presents which Chandragupta sent to Seleukos were certain powerful aphrodisiacs.

Eugenics in ancient India.—"King Sopithes (Saubhuti), whose nation excels in wisdom and lives under good laws and customs, enforced many interesting laws to safeguard and improve the quality of the racial stock. Here they do not acknowledge and rear children according to the will of the parents but as the officers entrusted with medical inspection of infants (done, according to Strabo, when two months old) may direct ; for if they have remarked anything deformed or defective in the limbs of the child, they order it to be killed. In contracting marriages they do not seek an alliance with high birth but make their choice by the looks, for beauty in the children is a quality highly appreciated.

(*v*) Indian teachers and texts in Alexandria

It must also be borne in mind that during the centuries before the Christian era Alexandria was the greatest centre of learning under the Ptolemys. It was here that Erasistratus and Herophilus lectured and attracted students from Europe and Asia, and left a school of medicine which continued the work of the schools of Cos and Cnidus for another 4 centuries through many vicissitudes. Ptolemy who followed Alexander through India must have been impressed with the Indian physicians and their skill. It connot be assumed that he was the only Greek leader who could take interest in Indian

culture and science after the end of Alexander's campaigns. The later Greek ambassadors at Indian Courts or the Greek kings of Indian kingdoms must have exchanged knowledge, books or personnel with the great centre at Alexandria. Eager disciples must have left Indian shores to study in far-off lands. Learned Acharyas of India may have been requisitioned for Alexandria. The professors of Alexandria must have been making enquiries about and collecting information on the theory and practice of medicine in India.

Lastly who can say what treasures of knowledge (ancient Indian medical texts, Manuals of medical instruction, treatises on allied subjects) were collected by the Ptolemys in the great library at Alexandria. History records that this was the greatest library in the world, and that it was reduced to ashes at least on two occasions. It is reasonable to think that had the library of Alexandria been spared from flames, some of the most ancient and original Indian treatises, now known only by name and by references in other later works may have been available on papyri or parchment, thus supplying to India part of all of her ancient knowledge and wisdom, just as the Arab libraries and writers gave back Hippocrates, Dioscorides, Galen and other classics to Europe, when all the works in the original languages, had been destroyed in the countries of their origin, by the armies and the fanatics of the dark ages. Still, Time may reveal more things than the present historians of medicine can dare to dream of.

* * *

CHAPTER II

SIDELIGHTS FROM MUDRA RAKSHASA

Mudra Rakshasa (Signet ring of Rakshasa) is a famous Sanskrit Drama, by Visakhadatta (of the 5th or 6th century A.D). It has a very intricate plot, in which Chanakya who destroyed the Dynasty of Nandas and placed Chandragupta Maurya on the throne of Magadha, wages a battle of wits with Rakshasa, the minister of the displaced Dynasty and succeeds by a clever use of the signet ring of Rakshasa in compelling the latter to become the minister of the new Emperor.

The poet, Vishakhadatta seems to have studied closely the Arthashastra of Kautilya, before writing his drama of politics, whose theme or plot is primarily concerned with the strategy for the conciliation of Rakshasa, the minister of Nanda, to function as the minister of the new king, Chandragupta Maurya and consolidate his sovereignity of Magadha Empire.

CHANAKYA: *Also called Vishnu Gupta or Kautilya. He is famous in ancient Hindu literature as the learned brahmin with an irascible temper, who took a vow to dethrone and destroy the Nandas and helped an ambitious and valiant youth to ascend the throne of Magadha as Chandra Gupta Maurya. Some scholars suggest that he was a brahmin from south India while others consider that he was a native of Takshasila, where he studied and travelled to Pataliputra to participate in disputations with the learned. He was the guide, philosopher and preceptor of Chandra Gupta, the founder of Mauryan Empire. After making Rakshasa minister of Chandra Gupta, Chanakya retired to the forests for penance.*

RAKSHASA: *The Loyal Minister of Nanda Kings continued even after the extirpation of the Dynasty to fight their cause against the usurpur, and schemed against Chanakya and Chandra Gupta. Due to superior intellect and strategy, Chanakya involves him in various plots. Ultimately to save the life of a dear friend, who*

protected his wife and children from the king's wrath and execution, Rakshasa agrees to the suggestion of Chanakya to become the minister of the new king Chandra Gupta.

(i) Allusions to Medicine

Jivasiddhi : *Indusarman, a classmate of Chanakya, proficient in polity, Astrology, and incantations assumes the guise of a Kshapanaka (Jain or Buddhist monk) and under the name of Jivasiddhi makes himself a great favourite of Rakshasa and cultivates the friendship of the commanders of the forces and kings raised against Chandra Gupta. All this is done under instructions of Chanakya to have a spy and a 5th columnist in the enemy's camp.*

Bitters and Sweets in Medicine. Jivasiddhi, a Buddhist called as a soothsayer into the presence of Rakshasa, alludes to the practice of *bitters and sweets* in medicine.

> "The precepts of the holy saints should ever be obeyed,
>
> By virtue of whose cooling drugs is passion' heat allayed
>
> whose healing skill a bitter potion here on earth has given,
>
> That afterwards, a sweet succeed and man find health in heaven " (Act IV. P. 215)

Medicines for pain.—Rakshasa hears the story of Jushnudas and asks why the man (Jushnudas) was dying by offering himself to the flames :

"What are his motives ? Pines he under anguish or bodily pain no medicine can assuage ? "

(Act VI. P. 240)

Arrow Wound.—Referring to Rakshasa, Chanakya tells Chandragupta,

"Like a barbed arrow from a wound

By dexterous sleight extracted, he was driven at length to quit the city (Act III P. 201)

Breast Milk and Baby's Nutrition.--Rakshasa makes a very interesting comparison which brings out the importance attached to *breast milk :*

"And the unpractised prince, who nothing knows Of Kingly rule, can no more hope to govern His empire with prosperity, deprived efficient council, than the babe receive Due nutriment, denied his nurse's breast" (Act IV. P. 214) .

(*ii*) DISEASES, SNAKES, VERSUS POLITICS

A Comparison Between Sickness and Royal Indignation.

In a scene in Pataliputra, a Subordinate of Chanakya named Siddarthaka dressed as public executioner, eyes,

"Let everyone who values his life avoid the displeasure of the king as he would poison. Sickness is a simple demolition of man's life and unwholesome diet, noxious only to himself But, he and all his perish, if he incur regal indignation".

Another comparison.

A street scene is introduced with a snake charmer, called Viradha.

VIRADHAGUPTA : *A spy of Rakshasa assumes the guise of a snake charmer exhibiting in the street of Pataliputra and conveys to Rakshasa secretly all the Political events in the enemy's camp at Pataliputra.*

Vir : Those who are skilled in charms and potent signs may handle fearlessly the fiercest snakes.

Pass : Hola ! what and who are you?

Vir : A snake catcher, your honour- my name is *Jirnavisha.* What say you? you would touch my snakes? What may your profession be, pray? Oh! I see, a servant of the prince ; you had better not meddle with snakes. - A snake-catcher unskilled in charms and antidotes, a man mounted on a furious elephant without

a goad, and a servant of the king appointed to a high station and proud of his success, these three are on the eve of destruction. (Act II).

Kings and Poison.

Chanakya refers to precautionary measures:—"The chiefs, whose ready aid placed Chandragupta firm on his throne, are faithful to his cause, And careful servants keep unwearied watch to baffle those who would administer envenomed draughts and viands to the King."

The Poisoner Poisoned.

ABHAYADATTA : *The Royal physician of Nanda Kings at Pataliputra and a friend of Rakshasa under whose instructions he prepared a poisoned medicine to administer to Chandra Gupta. The clever Chanakya who was present suspects the presence of poison by some indications, prevents Chandra Gupta from drinking it and orders Abhaya Datta to swallow the medicine he prepared. Thus Chandra Gupta is saved, and the poisoner punished.*

In the course of a dialogue, there is reference to attempts at poisoning, by a physician :

Rak: And what of our physician, Abhayadatta?

Vir: His tasks are all accomplished.

Rak: Is Chandragupta dead ?

Vir; No, Fate has saved him.

Rak: What meant your words ?

Vir: I will apprise your Excellency—The poisoned draught had duly been concocted, and would have been administered, but Chanakya, In pouring it into a golden goblet, observed the colour change, and thus detected the venomous admixture- then forbidding—the prince to taste it, ordered the physician to swallow his own dose - and thus he died.

Rak. A learned man has perished.

References to Headaches.—The play also contains a few references to ailments like headache. (*i*) King Chandra Gupta who had heated discussion with Chanakya and got excited, complained that his head was aching on account of that harsh squabble and wanted to go to the sleeping mansion. (Act.III). (*ii*) Rakshasa is reported to be troubled by headache brought on by sleeplessness, caused by the cares of the State. Rakshasa himself soliloquised "I pass night after night without a wink of sleep ". King Mala- yaketu also paid a visit to Raskhasa, when the minister was troubled with headache (Act. IV).

Arhats compared to Physicians.—There are occasional references to physicians, and their medicines. Kshapanaka (Jivasiddhi) entering into the presence of Rakshasa, refers to the precepts of the Arhats who are the physicians that cure persons of the malady of delusion, prescribing what is bitter only in the beginning but aggreable in the end. (Act.IV).

References to Ulcer over a Tumour.— When Malayaketu began to believe the false version of Jivasiddhi that Rakshasa murdered the princes' father by means of a wench whose system was fully charged with active poison, started accusing Rakshasa of this crime, the minister felt this new charge was like an ulcer over a tumour (Act. V).

Injuries and maladies of trees.—In a later scene Rakshasa entering the weed-grown garden which was formerly the royal pleasure park, presenting a woeful sight observes that serpents bandage with the bits of slough, the cuts of branches of trees that have been hacked with large and sharp axes and are sending forth cries of pain in the shape of incessant moan of pigeons. He also refers to those poor things overpowered by calamity and appearing to commit suicide by fire and eaten up internally by heavy grief in the shape of canker causing the trunk to wither. (Act. VI)

Vishakanya.—Though the tragedy caused by the use of Vishakanya occured at an earlier stage than the scenes depicted in the drama, the author makes Jivasiddhi relate the story of Vishakanya (A poison damsel whose

contact was believed to kill people). At the instance of Rakshasa, Jivasiddhi had created a poison damsel apparantly to bring about the death of Chandra Gupta. Rakshasa offered her as a precious gift to Chandra Gupta, who had usurped the throne of Magadha. Chanakya who was present at that meeting suggested to Chandra Gupta that Parvathakeswara, their friend and ally deserved to be honoured first with the offer of the precious present. Parvathakeswara, whom Rakshasa could not warn in advance accepted the present and in the bed chamber at the contact of the poison maid, the innocent victim expired and the damsel disappeared miraculously. Jivasiddhi who knew the real truth gave a twist to the story and made it appear that Rakshasa had schemed to murder Parwathakeswara, and succeded in creating in Malayaketu, hatred against the minister Rakshasa (Act. V.).

CHAPTER III

SIDE-LIGHTS FROM OTHER LITERARY SOURCES

*1. *Supernatural feats.* Brhatkatha version as preserved by Kshemendra and Somadeva contains an account of the struggle between Nanda and Chandra Gupta. Vararuchi narrates the story of the foundation of Pataliputra as well as the incidents relating to himself, Indradatta and Vyadi, who after prosecuting their studies in that centre, concieved of a plot, when they found that the King Nanda who had accumulated great wealth was reported dead. Being proficient in magic and endowed with supernatural yogic powers, Indradatta entered the dead body of the King, leaving his own body in the custody of a colleague and reanimated the corpse of the King. The revived king began to behave in a manner quite different from his old self.

According to Mahavamsa Tika, it was Chandra Gupta's corpse which was reanimated by yaksha named Devagarbha and on the discovery of the secret, Bindusara put the Yaksha to death.

2. *Cause and cure of madness.* Yogananda imprisoned his minister Sakatala and made Vararuchi (his Co-pupil,)a minister. Vararuchi however saved Sakatala's life. After some time, the king suspected Vararuchi and ordered his execution. Sakatala who was grateful, saved Vararuchi and hid him in his own house. When Yogananda's son named Hiranyagupta became mad owing to an act of ingratitude against the bear, the king Yogananda became sorrowful as he did not know what to do and exclaimed in his despair, that, if Vararuchi were alive, he would have explained the cause of his son's madness. On Sakatala informing the king, that Vararuchi was alive, the king received him into favour and Vararuchi not only explained the cause of the son's madness but also affected the cure of the prince, in a very ingenious manner.

***The root of Kusa grass could cause serious wound*,** With regard to the reason why Chanakya was trying to

destroy the root of kusagrass by pouring sugar or sweet gruel or butter milk, over the root, to attract ants and vermin which would bring about the destruction of the offending root, two versions are given.

1. One version is that his father while going for a bath had his foot pricked and consequently died; therefore, he was extirpating all the grass from the face of the earth.

2. The other version is that the root of the grass had pricked Chanakya on the eve of his marriage, and stopped the function arranged. Therefore, he was destroying the grass completely.

Chanakya's Medical Feats.

Making King's body proof against poison.—According to Teeka (Commentary) on Buddhist Chronicle, Maha-Vamsa, Chanakya was well versed in Vedas and mantras, magic and state craft. After he took an oath to dethrone and destroy Nanda who had offended him, he wandered about the country in search of a youth with qualities of potential sovereign and selected Chandra Gupta. He gave the youth not only training in physical feats and use of weapons in war but also devised a gradual programme of poisoned food to make Chandragupta's constitution, proof against the poison.

Delivering an Infant from the womb of the dead queen.—Another wonderful feat attributed to Chanakya is the obstetric operation, by which he brought into full life the foetus (Bindusara,) removed from the womb of Chandragupta's dead queen. It is also stated that the infant was reared by stages in the wombs of different goats.

CHAPTER IV

GLEANINGS FROM BUDDHISTIC LITERATURE.

(*i*) Gift of Honey

Mahavamasa gives the legend or story relating to Asoka, as a donor of medicine, in his previous birth. Here is the full extract:—

"Now once, in time past, there were three brothers, traders in honey; one was used to sell the honey. two to get the honey. A certain *Pacekabuddha* was sick of a wound; and another *Pacekabuddha*, who, for his sake, wished for honey, came even then to the city on his usual way, for seeking alms. A maiden who was, going for water to the river-bank saw him. When she knew, from questioning him, that he wished for honey she pointed, with hand outstretched, and said: "Yonder is a honey-store, sir, go thither."

The trader, with believing heart gave to the buddha , who came there, a bowl full of honey, so that it ran over the edge. As he saw the honey filling (the bowl) and flowing over the edge, and streaming down to the ground, he, full of faith, wished, "May I, for this-gift, come by the undivided sovereignty of Jambudvipa, and may my command reach forth a yojana upward into the air as well as downward into the earth." To his brothers as they came, he said: "To a man of such and such a kind I have given honey; agree thereto since the honey is yours also." The eldest brother said grudgingly: "It was surely a chandala, for the chandalas ever clothe themselves in yellow garments." The second said: "Away with thy pacekabuddha over the sea." But when they heard his promise to let them have a share of the reward, they gave their sanction. Then, the maid who had pointed out the store wished that she might become the royal spouse of the first, and prayed for a lovely form with limbs of perfect outline.

"*Asoka* was he who gave the honey, queen *Asamdhimitta* was the maid, *Nigrodha*, he who uttered the word 'Chandala', and *Tissa* he who had wished him away over the sea. He who had uttered the word

'Chandala' lived (in expiation thereof) in a chandala village, but because he had desired deliverance, he also, even in the seventh year, attained deliverance."

(*ii*) ASOKA MADE DRUGS EASILY AVAILABLE

Mahavamsa also narrates an incident, during the early part of the reign of Asoka, which spurred him to make arrangements for the provision of medicines in his capital.

"Once in time past, a dweller of the forest who first went forth into the forest from *Pataliputra*, loved a wood-nymph named Kunti. Later, owing to the union with him she bore two sons. The elder was named *Tissa* and the younger *Sumitta*. Afterwards, both received the *Pabbajja-ordination* from the "thera" *Mahavaruna* and attained to "arahatship" and the possession of the six supernatural powers."

"Once the elder suffered pains in the foot from the poison of a venomous insect, and when his younger brother asked him, what he needed, he told him that a handful of Ghee was the remedy."

"But the 'thera' set himself against pointing out to the king the things needful in sickness, and against going in search of the ghee after the midday meal. 'If, on thy begging-round, thou receivest ghee, bring it to me', said the thera Tissa to the excellent thera Sumitta. When he went forth on his begging-round he received not one handful of ghee, and, in the meanwhile, the pain had come to such a pass that even a hundred vessels of ghee could not have cured it. And because of that malady the thera was near to death, and when he had exhorted the other to strive unceasingly, he formed the resolve to pass into *nibbana*."

"Lifted up into the air as he sat, and winning mastery over his own body by the fire meditation, and according to his own free resolve, he passed into *nibbana*'. Flames that broke forth from the thera's body consumed the flesh and skin of his entire body, but they did not consume the bones".

"When the monarch heard that the thera had died in this wise, he went to his own '*arama*' surrounded by the multitude of his troops. Mounted on an elephant the king brought down the bones and when he had caused

due honour to be paid to the relics, he questioned the brotherhood as to the thera's illness. Hearing about it he was greatly moved, and had tanks made at the City gates and had them filled with remedies for the sick, and day by day, he had remedies bestowed on the congregation of the *bhikkhus*, thinking, might the *bhikkhus* never find remedies hard to obtain'. ''

''The Mahavamsa'' gives also some glimpses of life during the reign of Asoka. (P.-28).

''Day by day did the devas bring eight men's loads of water from the Anottatta Lake.; the king dealt it out to his people. From the Himalayas did the devas bring, for cleansing the teeth, twigs, of the naga-creeper, enough for many thousands, and healthful-fruits, myrobalan, terminalia, and mango fruits from the same place, perfect in colour, smell, and taste. The spirits of the air brought garments of five colours, yellow stuff for napkins, and also celestial drink from the Chaddanta Lake. Out of the Naga Kingdom the Nagas brought stuff, coloured like the jasmine blossom and without a seam, and celestial lotus flowers, collyrium and unguents. Parrots brought daily from the Chaddanta Lake ninety thousand waggon-loads of rice. Mice converted this rice, unbroken, into grains without husk or powder, and there with-was meal provided for the royal family. Perpetually did honey-bees prepare honey for him, and, in the forges, bears swung the hammers. Karavika birds, graceful and sweet of voice, came and made delightful music for the king. ''

Another interesting reference in ''The Mahavamsa'' relates to alms bestowed on 60,000 *bhikkhus*. The alms consisted of costly food, hard and soft food, charity for the sick, and tooth-sticks, called *nagalata*.'

In the city of Pataliputra, *Sigava*, son of a minister, is said to have lived in three palaces, fitted for the three seasons of the year.

(*iii*) HERBS AND INTERNATIONAL FRIENDSHIP.

The Mahavamsa also mentions the friendship between *Devanamapiyatissa*, king of Ceylon and Asoka, and the presents the former sent to India. Asoka received them and sent as return presents. ''Unguents brought by the Nagas, water from the Ganges and the from the

Anottotha Lake, yellow and embelic myrobalans *precious-ambrosial healing herbs*,etc. '' (P-80).

(*iv*) PUBLIC HEALTH AND MEDICAL AID IN CEYLON

Pandukabhaya, a king of Ceylon of this period, planned and constructed the beautiful city of Anuradapura. (P-74-75).

''He laid out also four suburbs as well as the Abhaya-tank, the common cemetery, the place of execution,the chapel of the Queens of the West, the banyan-tree of Vessavana, the Palmyra palm of the Demon of Maladies, the ground set apart for the Yonas, and the house of the Great Sacrifice; all these he laid out near the west gate.

"He set five hundred Chandalas to the work of *Cleaning the streets of the town, two hundred Chandalas to the work of cleaning the sewers*, one hundred and fifty Chandalas to bear the dead, and as many Chandalas to be watchers in the cemetery. For these he built a village north-west of the cemetery; and they continually carried out their duty as it was appointed.

"Towards the north-east of the Chandala village, he built a cemetery, called the Lower Cemetery, for the Chandala folk. To the north of this cemetery, between it and Pasana mountain, a line of huts for the huntsmen were built thenceforth. Northward from thence, as far as the Gamani tank, a hermitage was erected for many ascetics; eastward of the same cemetery the ruler built *a house for the 'nigantha', jotiya.* In the same region dwelt the *nigantha* named *Giri* and many ascetics of various heretical sects. And there the lord of the land built also a chapel for the *nigantha, Kumbhanda;* it was named after him. Toward the west from thence and eastward of the street of the huntsmen lived five hundred families of heretical beliefs. On the further side of Jotiya's house and on this side of the Gamani tank, he likewise built a monastery for wandering mendicant monks, a dwelling for the ajivakas, and a residence for the Brahmans; and *in this place and that, he built a lying-in shelter and a hall for those recovering from sickness.* ''

Princess *Chitta* is said to have gone into a "Lying-in-chamber'' when the time for her delivery approached. Yakshas are said to have kept guard over the child in the mother's womb.

CHAPTER V

ASOKA THE GREAT AND HIS EFFORTS TO PROMOTE HEALTH AND MEDICAL AID

ASOKA'S CONTACTS WITH THE GREEK WORLD

Asoka was born in 304 B.C., 5 years, before the death of his illustrious grandfather, Chandragupta Maurya. Asoka's coronation is believed to have taken place in 270 B.C. He had the singular good fortune of being spared the difficult task of founding and organising an Empire. It is also very fortunate that he himself has left a sort of autobiography in his message to his people—sermons in stone—expressing his conception of the duties of the Emperor and his interest in the life, health and welfare of his people. He went on tours of inspection to investigate the condition of the people and to gain first-hand knowledge, instead of depending on official reports. He died about 232 B.C.

Even Asokan Inscriptions, though they were imperishable records on permanent fixtures in Nature, were hidden away in jungles or were located in places remote from modern haunts of men, and have been coming to light—one after another—during the last 200 years. The knowledge of the script in which Asoka had his edicts written on many a rock or pillar had remained lost to India and had to be rediscovered by Prinsep, who first correctly read the Asokan alphabet in 1837.

It has been remarked that the formula "Thus saith the king Piyadasi" is singular in modern epigraphy without any precedent or imitation. It is known that this mode of beginning an inscription was in use in Persia and the inscriptions of King Darius begin with the words "Thus saith the King Darius". It is likely that this method of providing information and instruction to the people became known in India through the political connections of Darius with the Punjab. Though *Kautilya* refers to various types of writs (*Sasanas*), and modern archaeologists indicate the existence of Pre-Asokan columns or pillars, no *sasanas* or inscriptions of Chandra gupta Maurya, have been unearthed till now.

It is specially worthy of note that an edict mentions 5 Hellenistic countries : Syria, Egypt, Cyrene, Macedonia and Epirus. A Greek took the name of Dharmarakshita and was deputed as a missionary. A missionary named Maharakshita was sent to the Yavana (Greek) country. The lists of monks in *Mahavansa* and *Samantapasadike* have been confirmed by the inscription, in a relic box found at Sanchi (1st, or 2nd Century B.C.). Similarly, the legend of Asokan missions to Ceylon has been confirmed by the fresco paintings in Ajanta caves. The frequency of intercourse between *Magadha* and Ceylon could have been possible only with the help of a sea-going fleet. According to Strabo, ships were travelling up the Ganges up to Patna, the capital of the Magadha Empire. Did Indian ships sail to Egypt or China ? Did Egyptian ships or Chinese ships come to India? Probably increasing contacts with Persia and Asia Minor, Egypt and Greece, supplied the new stimulus or inspiration for a wider system of broadcasting information and instruction.

(*ii*) ASOKA'S CONCERN FOR PEOPLE'S WELFARE

A special body of officers was charged with the duty of attending to the moral and spritual welfare of all the subjects of Asoka (officials and non-officials, Buddhists and non-buddhists) and of even the royal relations at Pataliputra and provincial towns (*vehyesu cha nagarssu*). These officers called by the new and very appropriate title of "*Dharma Mahamatras*" constituted a separate department of Government service which did not exist before (*na bhutapurvah*) and which was entirely Asoka's innovation. The activities of this department extended over a wide field, even beyond the limits of his direct jurisdiction or administration, "to the Yavanas, Kambojas and Gandharas, and other nations on the western frontier," and also to the "Rastrikas, Pitinikas" (Rock Edict V), Nabhapantis, Bhojas, Andhras and Pulindas, in other parts of India (Rock Edict XIII). As such, the department must have been adequately manned with an army of officers. The department had also to send out some officers as Dutas (envoys or ambassadors) to carry Asoka's religious message to foreign countries both in the north and in the south—to the neighbouring but distant states of Antiochos Theos of Syria, and to the States of the four kings, Ptolemy Philadelphos of Egypt, Antigonos Gona-

tas of Macedonia, Magas of Cyrene, Alexander of Epirus; and lower down in the south, to the Cholas and Pandyas as far as Tamraparni or Ceylon.

There are many passages and phrases in the Edicts which echo Kautilya. Asoka said, "My highest duty is indeed the promotion of the good of all. There is no higher weal than the promotion of the common weal." Kautilya said "In the happiness of his subjects lies the king's happiness, in their good, his good; the satisfaction of his subjects and not his own, he should seek". Kautilya said that the "King should protect the afflicted among his people like his children". Asoka himself says, "All men are my children. As, on behalf of my own children, I desire that they may be provided with complete welfare and happiness, both in this world and the next, the same, I desire also for all men." (Kalinga R.E.I.)

Asoka also commanded his officers thus:—

"And for this purpose, am I instructing you....... and making known to you my will, my determination, and my promise, not to be shaken."

"Therefore, acting thus should you perform your duties and assure the people that they may understand that "the king is to us even as father; that he feels for us, even as he feels for himself; we are to him, as his children".

The *Rajukas* (Pillar E.IV.) were asked to acquaint themselves with what causes hahpiness or misery and with the help of the pious to admonish the people of the provinces. Asoka adds that he had committed vast numbers of his subjects to the care of *Rajukas* or Provincial Officers, with the same confidence as the father commits his child to an expert nurse.

"Indeed, just as a man, after having entrusted his child to a skilled nurse, rests assured with the thought that the skilled nurse will be able to keep his child well, even so the *Rajukas* were created by me for the good and happiness of the people."

Rock Edict II, alludes to proper treatment of slaves and employees. According to *Sigalovada Suttanta*, the master should minister to servants and employees in five

ways; among which two are "tending them in sickness (*gilanupathanena*) and providing constant relaxation, so that they need not work all day."

(*iii*) TESTIMONY OF EDICTS ABOUT MEDICAL CARE

Asoka established hospitals and other arrangements for the supply of Medicines, and provided medical men to afford treatment. Arrangements were made for the relief of suffering of both men and beasts, under which the state established botanical gardens for the cultivation of medicinal plants, herbs, roots and fruits, procured, when necessary, even by importation and then acclimatised (Rock Edict II,); besides maintaining hospitals and other arrangements for the supply of medicines and medical men for the treatment of diseases. "Considering the emphasis laid upon the healing arrangements for beasts, we must infer that there was no lack, in Asoka's time, of veterinary surgeons and hospitals."

Many humanitarian measures were in operation on a large scale and over a wide area.

"On the roads, too, banyan trees have been planted by me to give shade to man and beast; mango-gardens have been planted and wells dug at every half 'kos'; rest-houses, too, have been erected, and numerous watering places were made, here and there, for the comfort of man and beast". (Pillar Edict VII).

It may be pointed out that Asoka himself states that people had been made happy by previous kings by various kinds of facilities for comforts. According to *Samyukta Nikaya* people were supposed to go to heaven, if they were planters of trees, builders of cause-ways, wells, watering-sheds, etc.

According to Brahminical works on Law and Polity various public works of utility, such as planting of trees and provision of sources of water-supply, were included among the duties of kings.

As pointed out by Radha Kumud Mookerjee, "These comprehensive measures for the comforts of out-door life were called for, as much by the heat of the Indian summer,

as by the fact that the Indians, the classes and the masses alike, the old as well as the young, are very much given to travelling, as much in the interests of business, of trade, as for religion, which inculcates the duty of visiting on pilgrimage, the holy places of India, covering by their number and geographical distribution the entire area of this vast country."

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I may here briefly refer to the nature, emphasis, extent and significance of allusions to health and medicine in Arthasastra, pointed out by the various writers on Arthasastra and the historians, who wrote on Mauryan

* * *

Bandyopadhyaya refers to the code of personal hygienre, prescribed to the king, to precautions against poison by use of certain birds and animals and to the attendance of experts in healing the effects of snake bites or poisoning by other means (95) Food for the royal table was prepared under supervision and was also to be tested by being thrown into fire, by its effects on plates, by being administered first to chicken, birds, animals etc. The king was not to take any medicines, before they were tested by Physicians (98).

Bandyopadhyaya gives only a very brief note on the Medical Department.

" Physicians and nurses were also employed by the Government, constituting something like the modern RED CROSS or RED CRESCENT Department for the treatment of the sick and wounded.'

* * *

In the book *Chandragupta Maurya and his Times* R. K. Mookerji, who describes Chandragupta as India's first historical Emperor, refers to the principles of personal hygiene, measures of public health, provision of medical care and type of healers available in the Mauryan Empire.

In Chapter IV entitled ' The King ', it is stated that the young Chandragupta was trained and educated for a period of 8 years at Taxila under a scholar of encyclopaedic learning like Chanakya and other teachers in all branches of knowledge, theoretical and practical, and in all activities and type of conduct needed for an ideal king, who has to look upon his subjects as his children. According to Kautilya, the King had to do " Vyayama " or physical

exercises to keep his bodily humours in equilibrium and to maintain health. Hunting was encouraged as an exercise to reduce fat and increase sweating. According to Strabo, the favourite mode of exercise for the body was by friction in various ways and specially by passing ebony rollers over the surface of the body, and this was done by a class of people called " Samvahakas ".

The king was also to be protected against many dangers, including poisonous animals and poisons. Elaborate precautions were taken against poisoning and the King was to have always trained physicians and experts in the science of poisoning.

The description of the capital given by the Greek writers agrees fairly closely with the rules of town planning given by Kautila. In one place Mookerji notes : " This will be followed by shops of medical stores ". But I am inclined to interpret this world " Bhaishajyagriham " as referring to medical stores or dispensary and not to shops." .

Writing about the country and the people, Megasthenes stated that the Indian inhaled a pure air and drank the very finest water..

With regard to the Ministries and administrative, Departments, there were officers for supervising slaughter houses, courtesans and for collecting vital statistics, etc. The pay of physicians was fixed in the grade of 2000panas per annum, the same salary being given for teachers of Charioteering, trainer of horses for the army, etc. In the Department of Agriculture, arrangements were made for the cultivation of medicinal plants in different kinds of land as required. The Forest Department was to give attention to the various products including " Aushadhavargu ", *i.e.*, medicinal plants, yielding herbs, roots and fruits, used as medicines and also " Vishnavarga " or poisonous trees. The people were also given facilities and permission for the preparation of medicinal wines as approved by physicians.

In the Municipal and Village Administration, there were arrangements and regulations for protecting public health. Officers collected vital statistics including the

names of males and females of each house-holds, their caste, gotra and occupations, income and expenditure. Physicians treating patients suffering from suspicious wounds and masters of houses finding persons preparing dangerous or deadly drugs had to report the fact to the Gopas and Sthanikas, Otherwise they were liable to the same punishment as the guilty persons themselves. The towns, fortresses as well as the villages were planned according to the science of " Vastu " and tradition. The sanitary regulations of the towns were enforced strictly.

The building regulations were based on the needs of the sanitation. Special measures were adopted in the time of epidemics. Physicians were about the town distributing medicines while saints and ascetics were busy adopting religious remedies. It is said that the dangers from rats were recognised. Cats and mongoose were let loose and poisoned food for rats also employed. Every house-holder was expected to trap a number of rats, in times of epidemic.

Medical practice was regulated by rules. Dangerous diseases were to be reported. Physicians were fined if the persons died of disease that was not previously reported. The error of treatment causing death was more heavily punished. A surgeon was to lose the limb which he causes a patient to lose by his wrong operation. Mookerji writes that the medical profession consisted of the following classes of practitioners and specialists.

1. Ordinary physicians ;
2. Those who treated cases of poison;
3. those who specialised in midwifery ;
4. Surgeons who accompanied the army with surgical instruments and appliances.

The towns had also hospitals with medical stores containing sufficient quantity of medicine to last for years and were constantly replenished by fresh supplies. In the King's house-hold, the medical store contained specially all the medicines that were required for midwifery, and medicinal plants or herbs were grown in pots in the hot houses. The state also maintained herbariums.

Even in the legal matters, apart from the fact that health and diseases had a significant role in the validity of agreements, property rights, punishment and marriages,

Chandragupta had a very large army computed by Pliny at 6,00,000 infantry, 30,000 cavalry and 9,000 elephants and probably 8,000 chariots, excluding followers and attendants. Kautilya mentioned the medical and ambulance arrangements which Megasthenes failed to record. Surgeons carrying in their hands surgical instruments, apparatus, medicine, healing oils and bandages and nurses with prepared foods and beverages, should always be in attendance and encourage the soldiers to fight.

The army was also provided with veterinary surgeons who had not only to treat the diseases of horses and other animals but also to see that the physical growth and strength of the animals are maintained. Errors in the treatment were punished.

Apart from the regular physicians and army surgeons, etc., there were other classes of people who also acted often as healers. Among these were "Pramnai", a class of philosophers mentioned by Strabo. 'They ridiculed the Brahmans who studied Physiology and Astronomy as fools and imposters'. Some of them, called the "Pramnai of the mountains" wear deer-skin and carry wallets filled with roots and drugs, professing to cure diseases, by means of incantations, charms and amulets.

Another class of philosophers specialised in medicine and practised as physicians but preferred to cure diseases, by diet rather than by drugs. They invented valuable ointments and plasters. They also cured diseases by mantras and amulets. They specialised in Physiology, Pharmacy and Astronomy.

* * *

Kangle, the latest writer on Arthasastra, gives a detailed account of various aspects of society and the varied religious life of all classes of people, the magical practices and superstitions, the rites to ward off the dangers from the country, involving the use of mantras and roots of herbs, rites and practices supposed to produce manifestations or miraculous effects, the gullibility of the people, the belief in the dreams, belief in stars, etc. He also draws attention to the well regulated life in the city,

the regulation of accommodation for different communities and dresses, the census taken by the officers of the city, the rules relating to the planning of the city and the construction of buildings, tenaments, the arrangements for the disposal of rubbish, waste-water, rain water, etc., public eating houses, sale of meat, etc.; and the drinking of wine was regulated. There was control over the profession of the courtesan and over prostitution.

The administrative set-up is briefly mentioned. " We miss any interest on the part of the state in the education of the people ". The teaching was the monopoly of the Brahmins and the state could not interfere in their work. The various trades and crafts were handed down from father to son and from practitioner to apprentice. The State did not concern itself with imparting of education, academic or professional.

On the subject of health, Mr. Kangle adds : " It may similarly be said that a department of health in the modern sense finds no place in this administrative machinery. There are, of course, the army doctors, who are to keep themselves in readiness with medicines, instruments and bandages when a fight is about to begin. TheState is also expected to take suitable steps when there is an epidemic. Beyond that, the interest of the state appears to be restricted to seeing that no physician lends his indirect support to criminal activities by agreeing to treat wounds secretly ".

Though not actually and directly concerned with medical care or health, there are other references associated with life, disease and death. For instance, Kangle gives a summary of the procedure to be followed in the case of a sudden death, where murder or suicide may be suspected and post-mortem examination had to be carried out. Similarly, a brief summary is given of the procedure to be followed, if poison is suspected. Lastly, he refers to the preparation of the army for the battle.

" Finally, it is added that behind the army arranged for a fight, physicians and surgeons should be stationed with medicines, instruments and bandages for treating wounded soldiers. By their side should be woman in charge of food and drink for the soldiers. The women are also to encourage the soldiers to fight. These are not quite nurses in the modern sense of the term ".

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